AVIATION WEEK
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MAY 15, 1950

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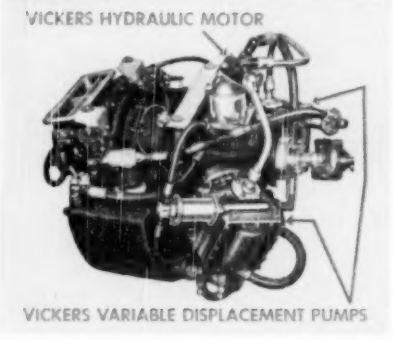

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ENGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921

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The design is so simple, false alarms from mechanical failure are impossible. With no moving parts, maintenance is negligible.

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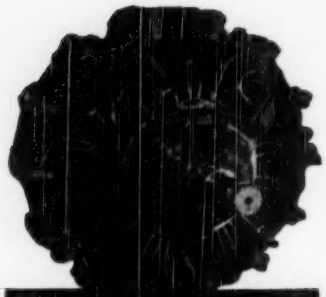

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Aviation Week

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Executive and Editorial Offices: 330 West 42nd St., New York 18, N. Y., Phone Longacre 4-3035; National Press Bldg., Washington 4, D. C., Phone National 3414.

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ONWARD and upward the course of American Aviation takes its way. What was impossible yesterday becomes mere routine tomorrow.
In this continuing drama Phillips 66 Aviation Products are playing an important role. Over and over again, under ever changing conditions, Phillips 66 Aviation Gasoline and Engine Oils have proved their worth. Today they are the choice of an ever-increasing number of military and private pilots, and commercial airline operators. They merit your confidence. The Aviation Department, Phillips Petroleum Company, Bartlesville, Oklahoma.
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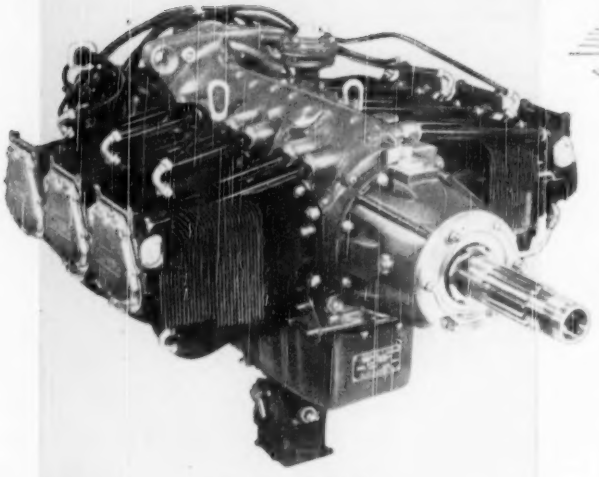

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NEWS SIDELIGHTS

Crossed Wires?

President Truman and his Secretary of Defense Louis Johnson are no longer seeing eye to eye on the outlook for Defense Department expenditures.

At his press conference May 4, the President stated that the Administration was not alarmed over the international situation and that the defense budget for the 1952 fiscal year would be smaller than the 1951 fiscal year budget now pending in the Congress.

On the other hand, in testimony before the House Appropriations Committee urging a $500-million budget increase for aircraft procurement, (made Apr. 26 and released May 6), Secretary Johnson said: "We have also appraised recent events which make it entirely possible that appropriations in excess of those which have been requested for the current year will be required in succeeding years, not only for our own military forces but also for the military aid program. Just as it is possible that in future years this nation will have to devote an increased percentage of its total budget to these items, it is also possible that our partners in the North Atlantic pact will be required by the force of events, and by the force of our collective planning as well, to take similar action."

AVIATION WEEK has learned that the U.S.'s defense budget—for both our own armed forces and for foreign assistance—will be increased from $3 billion to $6 billion over this year's $15-billion level, if the integrated program now under consideration by the North Atlantic Council in London is put into effect (AVIATION WEEK May 8). Most of the boost would be for aircraft. The U.S.'s primary role in the integrated program is strategic bombing.

Pocket Veto Possibility

The President was expected to sign legislation setting up a National Science foundation to administer a $15-million-a-year program in basic scientific research. But, with May 12 the deadline, the possibility of a pocket veto loomed as this issue went to press. The measure provides for a 24-member policy-determining board of men eminent in scientific fields, on a per diem basis, and a $15,000-a-year director and authorizes $500,000 for the 1951 fiscal year to launch the program. The board and director would be appointed by the President, but the board could recommend a director. In 1948 the President vetoed similar legislation because it lodged too much power in the board of part-time members with outside private affiliations, including the appointment of the director.

10 New Navy Copters

Sikorsky Aircraft's new big helicopter which the Army calls the H-19 and which the company calls its Model S-55, will soon have a Navy designation as well.

AVIATION WEEK has learned that the Navy has purchased 10 of the big helicopters using 1950 fiscal year funds, as its first step in the Navy's off-the-shelf anti-submarine helicopter program. As previously forecast in AVIATION WEEK March 27, Sikorsky had an edge on its principal competitors due to availability for early delivery, one of the strong factors in this competition.

R & D Center Inspection

Six major research and development centers of the three military departments are being inspected this week. Inspection party is headed by Research Development Board Chairman William Webster, Ass't. Army Secretary A. S. Alexander and Under Secretary of Navy Dan A. Kimball, who are both members of the Research and Development Board.

Purpose of this first joint tour by civilian members of the board is "to improve the unified cooperation of the research and development programs of the three services" (AVIATION WEEK April 24).

The party also includes top-ranking civilian and military leaders of guided missile, atomic energy, chemical warfare, and special weapons projects. They will visit: Dugway Proving Ground, Utah; Ft. Bliss, Texas; Holloman AFB, White Sands Proving Ground, Sandia Base, and Los Alamos, in New Mexico.

British Witnesses

Most powerful testimony last week at the Senate Interstate and Foreign Commerce committee hearing on jet transport prototypes was from a procession of new British jet and turboprop transports—flying across a motion picture screen in the committee hearing room at the Capital.

One by one the new British turboprops, the Vickers Viscount, the Armstrong Whitworth Apollo, the Handley Page Hermes, the Saunders Roe SR-45 flying boat, the giant Brabason, soon to be fitted with turboprops, and the swept wing de Havilland four-jet Comet, did a "flypast" on the screen, along with other new British types.

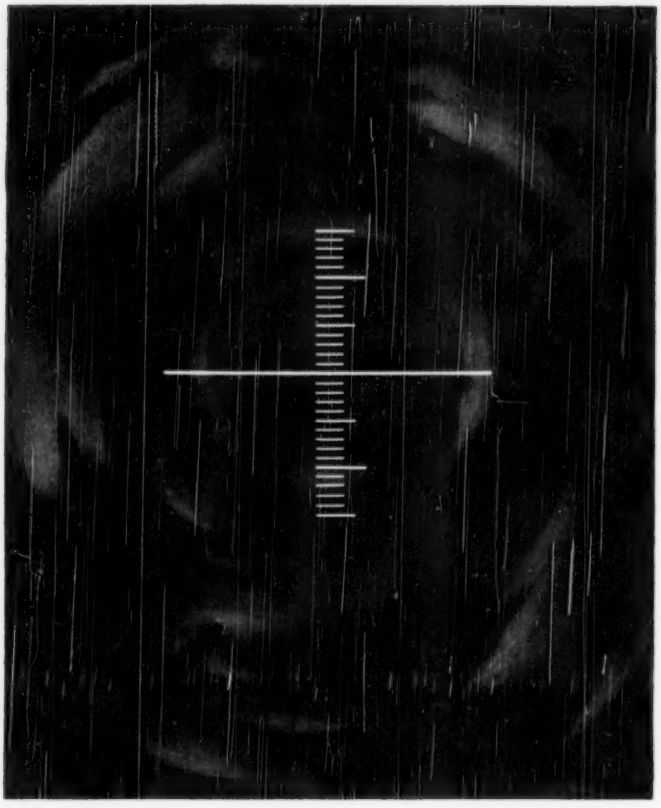
When the movie, a Shell Oil picture, was completed, Robert Ramspeck, Air Transport Assn. executive vice-president began: "Unless corresponding developments are made by U.S. manufacturers the U.S. flag airlines will have to buy those (British) airplanes or lose out in competition with the airlines which operate them . . ."

Talk about the Comet and the Canadian Avro Jetliner bulked large in the hearing. CAA Administrator Del Rentzel said the Jetliner was better suited to American certification standards than the Comet.

But Avro took its Jetliner back to Canada too quickly. It had originally scheduled its jet transport for a quick hop to Washington May 9, which by coincidence was the second day of the transport prototype hearing. Sparked by the congressional hearing on foreign jets, the Avro Jetliner could have been a publicity sensation in the American capital, if it had come to Washington.

Pilot Transfer Fight

Air Line Pilots Assn. has reemphasized its determination not to be left holding the bag because of the Civil Aeronautics Board's approval of merger, equipment interchange and point transfer deals between the carriers. ALPA is fighting for iron-clad employe protection provisions that would go far beyond the so-called "Burlington Formula," which has been used in the railroad field and has been suggested by a CAB examiner for application in the Pan American Airways-American Overseas Airlines merger case. ALPA says that if a route transfer is approved, the same number of pilots that used to fly the link should be transferred with their route if they so desire. Further, the union contends pilots affected adversely by CAB action should receive their full pay until they are again restored to a seniority position and an earning capacity equal to the one from which they were displaced. This indefinite period of protection, if agreed to by CAB, could make airline mergers, interchanges and other amalgamations a highly-expensive proposition.



"SIXTH SENSE" for the Automatic Pilot

The new Kollsman Altitude Controller brings positive correction to automatic piloting for the precise maintenance of a selected altitude. Weighing only twenty-five ounces, this unit combines the famous Kollsman high-precision aneroid diaphragm, the recently developed Kollsman Synchrotel and an especially designed DC magnetic clutch. Sensitivity is such that the Altitude Controller will respond to as little as a two-foot change in altitude and motivate the autopilot accordingly.

Testing now: a sister mechanism of the Altitude Controller—the Airspeed Controller, which will automatically maintain constant airspeed regardless of meteorological conditions.

Here again is demonstrated Kollsman's unrivalled leadership in aircraft instrumentation and control—especially wherein a pressure-sensitive element is the basic guide. Here is the name to be relied upon for solution of similar or allied problems in practically any industry. Inquiries invited. Address: Kollsman Instrument Division, Square D Company, 80-08 45th Avenue, Elmhurst, New York.

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AVIATION CALENDAR

May 16-19—53rd annual meeting of National Fire Protection Assn., Fairmont Hotel, San Francisco, Calif.

May 18-19—Annual meeting and third national forum of Corporation Aircraft Owners Assn., Hotel Statler, Washington, D. C.

May 18-20—Annual Meeting of Women's National Aeronautical Assn., Tulsa, Okla.

May 19-20—Seventh annual personal aircraft meeting, sponsored by Institute of Aeronautical Sciences, Lassen Hotel, Wichita, Kans.

May 22-23—Third annual air transportation conference, Purdue University, Lafayette, Ind.

May 22-25—9th annual conference of the Society of Aeronautical Weight Engineers, Hotel Miramar, Santa Monica, Calif.

May 23—National meeting of AIA airplane Technical Committee, Carlton Hotel, Washington, D. C.

May 23-24—40th National Aircraft Standards Committee steering committee meeting, Washington, D. C.

May 24-26—Technical conference on telemetering, sponsored by American Institute of Electrical Engineers and National Telemetering Forum, Benjamin Franklin Hotel, Philadelphia, Penn.

May 25-26—8th meeting of council for military aircraft standards, Navy Dept., Washington, D. C.

May 25-26—Aircraft Industries Assn. board of governors meeting, Williamsburg, Va.

May 25-27—Spring meeting, Society for Experimental Stress Analysis, Hotel Statler, Cleveland.

May 27—Annual spring air regatta, Philadelphia Aviation Club, Wings Field, Ambler, Penn. (May 28 is alternate date in event of bad weather.)

May 27-30—Wright Memorial Glider Meet, South Dayton Airport, Dayton.

May 30—Beginning of fourth session of the Assembly of the International Civil Aviation Organization, and the 6th session of the ICAO legal committee, Montreal, Canada.

June 1-4—Aviation Writers Assn. annual convention, Hotel Mount Royal, Montreal, Canada.

June 10-13—National Aeronautics Assn., annual convention, Hotel Statler, St. Louis, Mo.

June 10-25—International aero exhibition, Centenary Palace, Brussels, Belgium.

June 12-14—Mid-year meeting of Aviation Distributors and Manufacturers Assn., La Salle Hotel, Chicago.

July 7-8—Royal Air Force 1950 display, Farnborough airfield, England.

Sept. 5-10—Eleventh flying display and exhibition, Society of British Aircraft Constructors, Farnborough airfield, England.

Oct. 16-20—1950 annual general meeting of the International Air Transport Assn., Fairmont Hotel, San Francisco.

PICTURE CREDITS

13—(top) Northrop, (lower left) Wide World, (lower right) Glenn L. Martin; 15, 16—INP; 17—Republic; 18—(upper) Fairey Aviation, (lower) Blackburn and General Aircraft; 19—Northrop; 55—McGraw-Hill World News.

NEWS DIGEST

DOMESTIC

American effort to match Russia plane for plane and man for man would bankrupt the United States, according to Undersecretary of the Navy Dan A. Kimball, speaking recently in Los Angeles. He noted U. S. lead over Russia in reserve training programs, advances in scientific weapons, and unified defense program. Battleships, Kimball predicted, would be used only as launching platforms for guided missiles in any future war.

Stratos Corp., a subsidiary of Fairchild Engine and Airplane Corp., has sold almost a quarter-million dollars' worth of cabin pressurization units to Pan American World Airways for 14 L-049 Constellations. Delivery will begin this summer, with equipment to be installed at PanAm's Miami base.

Slick Airways flew 2,427,940 revenue ton-miles during April, the carrier's best April record since its start in 1946. Cargo included a polar bear.

Addition to F-89 order has been placed with Northrop Aircraft, Inc. Increase in number of scorpions ordered over original contract for 48 was not disclosed; but airframe contract price was over $52 million. Northrop's current military aircraft backlog tops the $100-million mark, but no personnel increase is foreseen.

Fifteen national air organizations have formed a conference to serve as clearing house and spokesman for problems of civil aviation. Original suggestion for the conference came from J. J. O'Connell, Jr., CAB chairman, and D. W. Rentzel, CAA administrator. First formal session following the preliminary meeting at Oklahoma City will be held in Washington, D. C., week of July 17.

United Air Lines was cleared of negligence in the Mt. Carmel, Pa., crash of a DC-6 in June, 1948. A Federal court jury returned a verdict of not guilty in a suit brought against the carrier by the estate of Earl Carroll.

FINANCIAL

Curtiss-Wright Corp. reports a consolidated profit of $1,546,620 for first-quarter 1950, with consolidated net sales of the parent corporation and subsidiaries totaling $30,706,997 for the same period. Wright Aeronautical Corp.'s contribution to the C-W profits was $1,049,230, more than two-thirds, with Wright net sales amounting to $18,636,738. Backlog of C-W and subsidiaries was given as $132,100,000, of which Wright accounted for $53,600,000, or nearly half.

Capital Airlines' net loss for first-quarter 1950 was $151,902 compared to $499,120 loss for the same period in 1949. Reduction in the 1950 figure was made possible by a non-recurring credit of $68,219, earned on purchase of debentures for sinking fund payments. Capital's operating loss totaled $128,032 compared to the 1949 figure of $353,480. Net profit from operations during March 1950 was $7166, with additional gain of $16,097 from purchase of debentures for the sinking fund. Carrier's operating revenue for March was $2,148,110.

Lockheed Aircraft Corp., declared a dividend of 50 cents per share on capital stock, payable June 15 to stockholders of record May 31. Lockheed's first-quarter profits are ahead of these for same period in 1949.

Garrett Corp. reports a preliminary consolidated net profit of $1,437,873 after taxes for nine months' period ending March 31, 1950, an increase of almost 30 percent over the corresponding period in the previous fiscal year. Gross revenues were up 26 percent, to a value of $16,131,607. Company's AiResearch division has accumulated a backlog of $16,500,000.

Western Air Lines showed a first-quarter net loss of $37,707 compared to $128,529 net loss for the same period in 1949. Revenues were up 20 percent, with expenses increased 12 percent over last year.

Trans World Airline net loss in the first-quarter was $1,844,049, compared with $3,013,020 net loss for 1949's first three months. Total operating revenue on TWA's domestic and international routes dropped from $21,437,746 to $21,173,014, although passenger revenue showed a small gain.

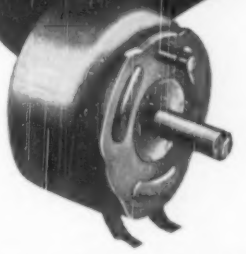
INTERNATIONAL

De Havilland Aircraft Co. appeals for CAA's acceptance of Britain's Certificate of Airworthiness to permit sales of British aircraft in the United States. De Havilland claims there is great interest in the Comet here, as well as in the Dove and Heron feederliners, but difficulties of securing certification hamstring possible sales. Appeal was voiced by A. S. Butler, chairman of de Havilland, in that company's annual stockholders' report.

IATA's technical conference, fifth annual session and first in the U.S., brought aviation technicians and operations men of 70 international airlines from all parts of the world to Asbury Park, N. J. Brig. Gen. Harold R. Harris, vice-president and general manager of AOA, was elected chairman of the conference, which runs through May 20.

LEDEX

ROTARY SOLENOID



SOLVES MANY REMOTE CONTROL PROBLEMS

The many production applications of Ledex Rotary Solenoids vary from the dependable, snap-action tripping of airborne bomb releases to the actuation of rugged, hydraulic valves in heavy duty materials handling equipment.

Five Ledex Rotary Solenoid models are manufactured. Diameters range from 1⅛ to 3⅜ inches. Predetermined rotation up to 95° can be engineered to suit your product's requirements. Starting torques for 45° stroke range from ¼ pound-inches to 50 pound-inches.

We supply to quantity users and solicit the opportunity to be of assistance in engineering a Ledex Rotary Solenoid to meet your product's requirements.

MODEL NO.	2	5	6	7	8
Diameter	1⅛"	1⅝"	2¼"	2¾"	3⅜"
Torque lb. / inches	¼	5	10	25	50
Weight lbs.	⅛	½	1	2¼	4¼

Magnetic action moves the armature along the solenoid axis. This action is converted into a rotary motion by means of ball bearings on inclined races.

WRITE DIRECT TO

G. H. Leland INC.

105 WEBSTER STREET

DAYTON 2, OHIO

INDUSTRY OBSERVER

► Four manufacturers are fighting it out in the liaison plane competition at Ft. Bragg. Meanwhile, a fifth is scrambling frantically to get its damaged plane back in the running. Cessna, Piper, Taylorcraft and revived Luscombe are the active competitors. Fletcher Aviation Corp., Pasadena, Calif., would have been there too. But Fletcher ran into bad luck in a preliminary flight test at Wright Field. The test pilot and observer bailed out of the Fletcher prototype after controls were damaged, apparently in a dive. The all-metal liaison plane then leveled off, unpiloted, and made a fairly good landing by itself—except that the landing was upside down.

► If the Navy's Lockheed P2V Truculent Turtle had been powered by Wright Turbo-Cyclone 18 engines, instead of the earlier Cyclone 18s it used, its world long-distance flight record could have been 2200 miles longer. That's what Wright Aeronautical Corp. engineers say. The record, on the same fuel would have been 13,483 miles, instead of being 11,236 miles.

► One of the facts about the very fast Martin XB-51 three-jet bomber, still not generally known, is that low-pressure tires are used on the plane for better close-in ground troop support landings and takeoffs on rough fields.

► Avro officials looked for, but did not find, any serious operational problems in the recent jetliner flight from Montreal to New York International Airport and demonstrations that followed. Observers were not bothered by exhaust heat when they stood a normal distance from the plane on the ramp. No engine heat damage was observed on runways. And Avro officials say enough fuel could be carried for normal plane stacking in marginal weather if the payload were cut sufficiently.

► Recent mystery "explosion" in the Wright Field vicinity was traced to a test pilot in a jet fighter (probably F-95A) who turned on his afterburner and produced a terrific roar that was thrown downward by a peculiar combination of cloud reflection and atmospheric conditions.

► Recent Russian reports of launching sites for long-range guided missiles aimed at the U. S. recall similar German reports in 1945, afterward found to be pure propaganda. Russian stories may have come from recent development of a longer-range V-1 type weapon or a pilotless turbojet aircraft, since few laymen can distinguish between reaction-propelled types. Or the reports may be completely phony, like some German reports planted in South America.

► Glenn L. Martin Co. has licensed a new flame-retarding resin compound to du Pont for further research and probable eventual commercial production. Designated "HMP," the compound was originally developed by Martin for flame-resistant curtains and upholstery for the 2-0-2 airliner. It is designed to be durable when laundered or drycleaned and to remain soft to the touch.

► NACA research facilities were utilized extensively in development of the unique quadricycle landing gear used on the new Fairchild C-120 detachable-pack plane, due to fly almost any week now at Hagerstown. Stability analysis disclosed that the plane had completely different stability characteristics, both longitudinal and directional, and different center of gravity ranges, with the fuselage pack on or off, requiring elaborate dynamic stability calculations before the plane could be built.

► Two turboprop engines are on display current in Washington. Allison T-40 double turbine installation (rated at 5500 hp.), complete with gear box but lacking propellers, is on display in the Navy Department lobby. British Overseas Airways Washington office (1124 Connecticut Ave.) is exhibiting an Armstrong Siddeley Mamba rated at 1010 brake hp. plus 307-lb. jet thrust.

► Consolidated Vultee's delta-wing XF-92A experimental jet fighter was flown back to San Diego by Capt. Charles Yeager, first supersonic pilot, for installation of a later and more powerful Allison J-33 engine with afterburner. Plane will be returned to Edwards AFB for further tests following completion of modification.

WHO'S WHERE

In the Front Office

Adm. John W. Reeves, Jr., has been appointed general manager of Los Angeles department of airports and is scheduled to take over his new post about June 15. Adm. Reeves retired from the Navy May 1 after serving 39 years. He completed flight training at Pensacola in 1935. In 1945 he joined NATS, remaining until it was merged with the Air Force. He concluded his Navy service with the Training Command.

Floyd S. Bennett, Jr., has been named treasurer of Fairchild E&A Corp. He joined the company's aircraft division in 1940, and later became asst. division comptroller. The position of asst. comptroller is being filled by **P. A. Britner.**

C. Stewart Ferguson has been made technical director of Marshall-Eclipse division of Bendix Aviation Corp., at Troy, N. Y., where he will be responsible for developing new heat and wear-resisting brake lining materials for aircraft, automotive and industrial fields and will also direct the company's new product and research department. He formerly was with General Electric for 31 years as chemist, engineer and executive.

Robert L. Turner has been named vp-sales for Northeast Airlines. Prior to joining NEA, Turner had been general traffic manager of Eastern Air Lines for 15 years. During the last war he served with the Air Transport Command as asst. chief of staff of the North African division and was traffic officer at the Cairo and Yalta conferences.

Richard S. Mauer has been appointed vp-general counsel of Chicago & Southern Air Lines. He retains his position as secretary of the airline. During 1941-1943 he served with Civil Aeronautics Board on the general counsel's staff and joined C&SA in the fall of '43.

Honors and Elections

John C. Leslie, Pan American Airways' vp, has been elected a director of the carrier, and effective June 1, he will be vp-administration, succeeding the late **Howard B. Dean.** Vp **Erwin Balluder** has been appointed deputy to Leslie. . . . **Willard W. Keith** has been elected to board of Lockheed Aircraft, replacing **H. E. Ryker.** . . . **C. S. "Casey" Jones** has been named to serve a one-year term of president of the Wings Club, N. Y., succeeding **Gen. Follett Bradley.** Three new vps of the club are: **O. M. Mosier, Roger Wolfe Kahn** and **L. B. Richardson.** . . . **A. F. Logan** has been elected vp-industrial relations of Boeing Aircraft. . . . **Charles H. Babb** has been named president of the Conquistadores del Cielo. . . . **Sidney F. Brody** was elected to the board of Mid-Continent Airlines.

Gill Robb Wilson, Herald Tribune aviation editor, has received Aviator's Post 743 Gold Medal for "distinguished service in Aviation journalism." . . . **Capt. Daniel Darnell, Jr.**, North American Aviation engineering test pilot, has been awarded a ninth Oak Leaf Cluster to his Air Medal for flight test work on guided missiles.

Air Force's standard troop and cargo transport, the Fairchild C-119 Packet, with Hamilton Standard propellers.

HAMILTON STANDARD

WHEREVER MAN FLIES

Here's one of the finest fields in New England

THIS BIG SPACIOUS . . . friendly airport, located smack in the busy center of New England's flying activities, is a bright spot on anyone's air map. Transient and local flyers have discovered the many advantages of its modern equipment, complete and efficient services and the cooperative . . . genuinely hospitable spirit of the East Coast Aviation Corporation, its management and working personnel.

It's not surprising that Bedford Airport is patronized heavily by private flyers, cargo carriers, military units and research flying. Nor is it surprising that such an airport provides its customers with top quality Cities Service aviation products and services . . . exclusively. For throughout the nation you'll see more and more alert, well-managed airports displaying the bright, familiar green and white sign of Cities Service.

CHECK THESE EXTRAS

Convenient location—complete C.A.A. authorized maintenance—control tower, radio and night lighting facilities (24 hrs.), including omni-directional homing beacon and flashing air beacon—three 7000' runways—flying school—charter service—restaurant—and only 20 minutes to downtown Boston by bus or "drive-yourself" auto.

Cities Service Aviation Gasolenes
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Cities Service Aero Oils
Cities Service Cisco Solvent Engine Cleaner
Cities Service Aero Greases and
Aviation Specialty Lubricants

CITIES SERVICE

AVIATION PRODUCTS

New York • Chicago • In the South: Arkansas Fuel Oil Co.

New Jet Planes in the News . . .

NORTHROP YRB-49A long-range photo-reconnaissance plane powered by six Allison J-35s takes off on first flight to Edwards AFB. Note external pod installation of two engines. Latest type high-altitude cameras are fitted in "stinger's" aft portion.

NORTH AMERICAN YF-93A, long-range penetration jet fighter, is much faster than world speed record-holding F-86 Sabre from which it was developed. P&W Turbo-Wasp engine delivers 6250-lb. thrust dry, and 8000-lb. thrust flash power with afterburner.

DH VENOM single-place fighter is improved Vampire having more powerful DH Ghost turbojet and thinner air foil.

MARTIN XB-51 number two zooms out of Martin Airport on its first flight and gets its gear up in a hurry.

Vol. 52, No. 20

AVIATION WEEK

May 15, 1950

Where Prototype Testing Money Would Go

Air Coordinating Committee's itemized breakdown on proposed expenditures of $12,495,000 for testing, operation and modification of jet and turboprop aircraft during a two-year period, over commercial routes (Johnson-Brewster Senate Bill 3504) shows:

Two-Year Operational Tests

- Operating 6 jet planes first year on commercial route pattern for $1000 an hr. for 100 hr. $100,000
  (To obtain data for airplane flight manual. No insurance allowance.)
- Operating one jet plane 4 hr./day at rate of 300 days/year 480,000
  (Based on DC-6 direct operating cost of $200/hr. Plus 100 percent for more fuel and low utilization.)
- Conversion of 2 Convair-Liners or Martin 2-0-2s to turboprops 385,000
- Operation and testing of two civil type planes with turbine power;
  1. 100 hr. CAA type certification at $1000/hr. 100,000
  2. 150 hr. CAA accelerated service tests at $750/hr. 105,000
  3. Operation of two planes at 600 hr. (each) airline tests at $250/hr. 300,000
  (Assumes 4-hr. day, 150-day test period; cost projected from $130/hr., present operating cost of Convair-Liner and Martin 2-0-2.)
- Operating 6 jet planes second year for 1200 hr. at $350/hr. 420,000
- Operating two civil type planes, turbine power, second yr. (2000 hr. at $250/hr.).. 500,000

Total Operational Tests $2,390,000

Note: Jet plane shown in first, second and fifth items presumably will be North American B-45 light four-jet bombers discussed for a trial operational program of this type to provide operational experience on multi-jet aircraft under simulated commercial transport conditions.

Prototype Tests

- Testing three four-jet passenger transport prototypes:
  1. Operating three planes 250 hr. each for CAA certification at $3000/hr. $2,250,000
  (Plane carries 20,000-lb. payload; 2400-mi. range; 500-mph. block speed.)
  2. Operating three planes 200 hr. each for CAA accelerated service test at $2000/hr. 1,200,000
  3. Operating six planes (two of each of three types) 1000 hr. each for airline operational flight test at $300/hr. 1,800,000
- Testing one long-haul cargo prototype powered with four turboprop engines:
  1. Operating plane 250 hr. for CAA type certification at $4000/hr. 1,000,000
  (Plane carries 50,000-lb. payload; 2000 mi.-range; 225-mph. block speed.)
  2. Operating plane 150 hr. for CAA accelerated service test at $3000/hr. 450,000
  3. Operating two planes of this type 500 hr. each for airline operational flight tests at $500/hr. 500,000
- Testing one short-haul cargo prototype powered with two turboprop engines:
  1. Operating plane 200 hr. for CAA certification at $700/hr. 200,000
  (Plane carries 13,000-lb. payload; 1000-mi. range; 300-mph. block speed.)
  2. Operating plane 150 hr. for CAA accelerated service test at $700/hr. 105,000
  3. Operating two planes of this type 500 hr. each for airline operational flight tests at $100/hr. 100,000
- Modifying and altering five prototypes as found necessary 2,500,000
  ($500,000 allowance for each plane for problems in flight and service testing periods.)

Total Prototype Testing Program $10,105,000

Grand Total Operations, Testing, Modification . . . $12,495,000

Prototype Fund Need Set Before Senate

Hearings accent gap between $12.5-million U.S. test plan and heavy British outlay.

By Alexander McSurely

U. S. airlines and aircraft manufacturers badly need government financing for jet transport prototypes. Their spokesmen told the Senate Committee on Interstate and Foreign Commerce so, last week.

They like the Air Coordinating Committee's $12.5-million program for testing new transport prototypes. But whether that money is enough to break the deadlock of U. S. jet transport developments in the near future is gravely doubted.

Difference between that amount and the $300 million which Great Britain

reputedly has invested in its postwar air transport prototype developments was pointed up repeatedly, before the Senate committee last week.

Senator Ed Johnson, chairman of the committee, and Senator Owen Brewster, second ranking Republican member, turned a sympathetic ear, for the most part, to U. S. transport needs.

But questioning from the Senators, and testimony of the witnesses over the first two days of the hearings, indicated some trends in the thinking of the committee and the witnesses. From these it is logical to make these forecasts:

• **Senate Bill 3504**, the $12.5-million testing program, (first reported in AVIATION WEEK Jan 30) is the only bill under consideration at the hearing which has much chance in the present Congress.

Definitely headed for oblivion are two other bills: S. 3507 calling for a new federal agency, the Aircraft Development Corp., to spend $100 million for transports to be leased, or stockpiled for military emergency, and S. 2984 which wants $5 million for development of new industrial and personal aircraft.

• **Senators Johnson and Brewster**, most outspoken members of the committee, are not about to spend any of the $12.5-million testing money in testing a Canadian or British jet prototype transport.

They think most of the $300 million already spent on British transport development has come from U. S. contributions. If U. S. is going to make any further jet transport development contribution, let it be for U. S. developments to catch up with the British ones, is their view.

• **U. S. Airlines** are taking a practical position. They would rather have U. S. jet transports. But if they have to compete with foreign airlines using foreign jet transports, they are willing to buy them, too.

Sampling of testimony at the hearing shows agreement that the $12.5-million testing program (outlined in accompanying table) should be enacted, and put in operation promptly.

Witnesses said:

• **C. R. Smith**, American Airlines president: "It is more important to get the program going than to differ about which agency shall have responsibility. I am hopeful Congress will pass S. 3504 at this session."

• **Robert Ramspeck**, Air Transport Assn. executive vice president: "The bill probably does not provide a complete solution. Nevertheless in view of the concrete accomplishments which can be made and the long delay which is likely to result of the matter it is to be restudied, we urge the committee to report the bill in order that some progress can be made immediately."

• **Adm. DeWitt C. Ramsey**, Aircraft Industries Assn. president: "Members of AIA heartily endorse this bill. It is only a partial solution to the challenge of the British. This challenge can be met fully only by a comprehensive prototype procurement program."

• **J. W. Crowley**, NACA associate research director: "Provisions of Bill S. 3504 . . . offer a means of expediting research in several important fields. The staff will strongly recommend to the committee endorsement of S. 3504."

• **Delos W. Rentzel**, CAA administrator: "Of all the bills I believe S. 3504 is the one best adapted to meet the needs of U. S. aviation. I feel you have a bill on which . . . all interested groups can agree."

• **Joseph J. O'Connell, Jr.**, CAB chairman: "The board wishes to go on record in these hearings as favoring its early enactment."

• **Felix Larkin**, Department of Defense general counsel: "The Department of Defense is not given any obligations or responsibilities under the bill, and it is therefore, outside the purview of our operations and jurisdiction. The Department does not find anything in this bill which interferes with military operations or plans and we have agreed to endorse it."

Main obstacle likely to prevent any other prototype legislation from passing this year is the Bureau of the Budget. It was the bureau's ruling which stopped the Air Force earlier in the current session of Congress, from carrying out a more extensive program. Some sources say that the Air Force did not want to handle the program, and was glad to be relieved by the Bureau of the Budget. But at any rate, the bureau spoke, and the $30-million program which had been planned to build two transport prototypes,—one military, one commercial designed for military conversion—was scrapped.

Evidence from government officials at the hearing made one thing clear. The $12.5-million program to be conducted by CAA is all that the Budget Bureau will approve. Anything larger presumably faces the formidable prospect of President Truman's veto, if it should get through Congress.

Biggest optimist about the $12.5-million program was CAA Administrator Del Rentzel, who will have to administer it.

"I wish I could share your optimism that an expenditure of $2.5 million a year for five years would accomplish as much as the British expenditure of $212 million," Sen. Johnson told him after his testimony. "Comparing $2.5 million against $212 million isn't very exciting."

Rentzel painted a glowing picture of aircraft manufacturers stimulated to development efforts of their own by the government offer to finance the testing. It was a picture which was largely rubbed out, later on, by the more dubious spokesmen for airlines and manufacturers.

Johnson referred to a change proposed in the bill which would transfer the administration of the testing program from the administrator to the Department of Commerce. Rentzel explained that it was contingent on the proposed reorganization plan for the Department of Commerce, giving all power to the secretary.

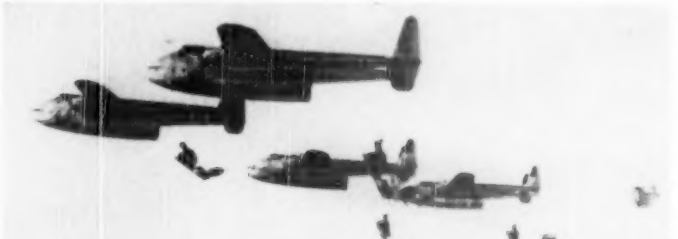
"What are you doing," Johnson asked, "recommending that we chop off your own head?"

"That is essentially correct," Rentzel replied.

Question of whether a phase of the testing program involving testing six jet aircraft on an airline operational pattern, might involve use of the Canadian Avro Jetliner or the British de Havilland Comet turbojets, brought interestingly varied reactions from the witnesses.

Obviously the airline spokesmen, Smith and Ramspeck, were quite willing to have the foreign jet transports tested.

"You mean you think that might



HERE COMES THE AIRTILLERY

105-mm howitzers are dropped from Fairchild C-82s of the 9th Air Force troop carrier units during a demonstration by the 82nd Airborne Division at Fort Bragg, N. Car. The guns were pulled to strategic firing positions by jeeps which were dropped from the same aircraft a few seconds later.

needle the American manufacturers into development action?" Brewster asked.

Tom Davis, assistant secretary of Commerce for Air, told the committee he thought the program would apply only to American planes. And Administrator Rentzel said that he thought the "buy American" clause in U. S. procurement contracts would stop any purchase of the Canadian or British jets for this program; but, he added, maybe a leasing program could be worked out.

Originally it had been planned to do this testing operation with four North American four-jet B-45 bombers, Davis told the senators. However the Air Force has never agreed to turn over the necessary planes for the operation, and, Pentagon sources say, doesn't want to release them.

Sidelight of the Defense Department testimony was the explanation by Maj. Gen. Laurence Kuter, MATS commander, of criticisms on Exercise Swarmer (AVIATION WEEK May 1). Most of the criticisms on slow handling and inadequate equipment, he said, were "focused on requirements for specialized military transports to handle dense and heavy cargo." Such aircraft are under procurement he added.

"No one would quarrel with the contention that many more specialized transports could have been used to advantage in Exercise Swarmer," Gen. Kuter said.

Folly of stockpiling present-day cargo planes against a future emergency and "shutting your eyes for 30 years" was pointed out by the Department of Defense general counsel. Larkin emphasized that need for training military transport pilots and crews was a valuable if secondary by-product of the operations of MATS.

Air Force Stars May Shine Brighter

Air Force will gain three four-star generals and 10 three-star generals if legislation introduced on Capitol Hill last week is enacted.

Bills introduced simultaneously by Sen. Millard Tydings (S-3496) and Rep. Overton Brooks (HR-8277) would place USAF for the first time on an equal status with Army and Navy. Each is authorized to have five four-star generals and 22 lieutenant generals, while the Officer Personnel Act of 1947 still limits Air Force to three four-star ranks and 13 three-star ranks.

General Hoyt S. Vandenberg, Air Force Chief of Staff, told the House Armed Services Committee last week that this statutory limitation is seriously impeding command functions of the Air Force.

"We find ourselves", Vandenberg declared, "in many instances unable to provide officers of rank commensurate with positions of great command and staff responsibility, not only within the command structure of USAF but also on joint staffs composed of members of our land-sea-air team, and on combined command and staff organizations composed of American officers and those of other nations.

"Our major combat commands—the Strategic Air Command and Continental Air Command and Air Material Command—by lieutenant generals," Vandenberg said. "Our present commanding general of the Air Materiel Command is also a lieutenant general despite the fact that he is responsible for providing the entire logistics support of USAF and controls resources valued in excess of $12-billion."

Four top ranking USAF generals, Vandenberg also pointed out, are currently assigned to special duties outside the Air Force and therefore are not available for USAF posts. These are: Gen. Joseph T. McNarney, director, Defense Department Management Committee; Lt. Gen. Elwood P. Quesada, Commander, Joint Task Force Three; Lt. Gen. Hubert Harmon, USAF Representative on the United Nations Military Staff Committee; and Lt. Gen. Lauris Norstad, Commander, "Exercise Swarmer", and now due for reassignment.

If the proposed legislation is enacted, Strategic Air Command, Continental Air Command and Air Materiel Command will be commanded by four-star generals. This will be in addition to two four-star ranks for Chief and Vice-Chief of Staff, USAF.

Commands which will be due for three-star commanders will include: Air Training Command; Military Air Transport Service; Air University; Alaskan Air Command; Tactical Air Command; Research and Development Command; U. S. Northeast Command; U. S. Air Forces in Europe; Far East Air Forces; Inspector General; Special Assistant for Reserve Forces; Military Staff Committee Representative, United Nations; Director of Staff, Defense Department Board; Deputy Commander, Strategic Air Command; Deputy Commander, Continental Air Command; Deputy Director, Air Materiel Command; Deputy Chief of Staff for Operations; Deputy Chief of Staff for Materiel; Deputy Chief of Staff for Personnel; Deputy Chief of Staff, Comptroller; Deputy Chief of Staff for Development; and, commandant of one of the joint colleges.

Avon for Australia

(McGraw-Hill World News)

Melbourne—The Commonwealth Aircraft Corporation, now building 5000-lb. thrust Rolls-Royce Nene turbojet engines, may soon change over to the more advanced Rolls-Royce Avon. The Tay may be considered as an alternative. The Avons would be used to power the Canberra bomber, also to be built in Australia, and an Australian-designed twin-seat fighter.

Meanwhile, production of Nenes is running ahead of the assembly of Vampire fighters which are at present the only outlet for the jets. Twenty engines are awaiting completion of Vampire fuselages at the Bankstown, N.S.W., plant of the de Havilland Company. So far, only three complete fighters have been delivered to the Royal Australian Air Force. There are 50 Vampires on order for delivery by the second half of 1951, but assembly is still at the rate of less than one machine a month.

Commonwealth Aircraft Corporation tooled up for production of the Nenes three years ago and de Havilland's branch plant in New South Wales got ready for assembly of the Vampire at about the same time. In the meantime, de Havilland bought out General Motors' share in Commonwealth Aircraft Corporation.

B-36 ENGINE NACELLE CARRIER

B-36 can carry four of its own spare powerplants to advance bases by means of new engine nacelle carrier shown suspended from plane's bomb bay. Two pods are interconnected by crossbar. Each carries two engines, is 32 ft. long.

Redesigned Wing Marks New Jet Fighter

YF-96A, developed from Republic's Thunderjet, features swept wing.

The USAF sweptwing Republic YF-96A jet fighter has been delivered to Edwards AFB, Muroc, Calif., where it is being readied for flight test late this month. Taxi tests were completed at Republic Aviation Corp., plant, Farmingdale, Long Island.

The sweptwing version F-84F was redesignated YF-96A because of extensive design and engineering changes. Except for the swept-wings the plane is similar in appearance to the F-84E. Fuselage of the YF-96A is essentially the same as that of the F-84E, but its 34-ft. wing span is 2 ft. 6 in. shorter.

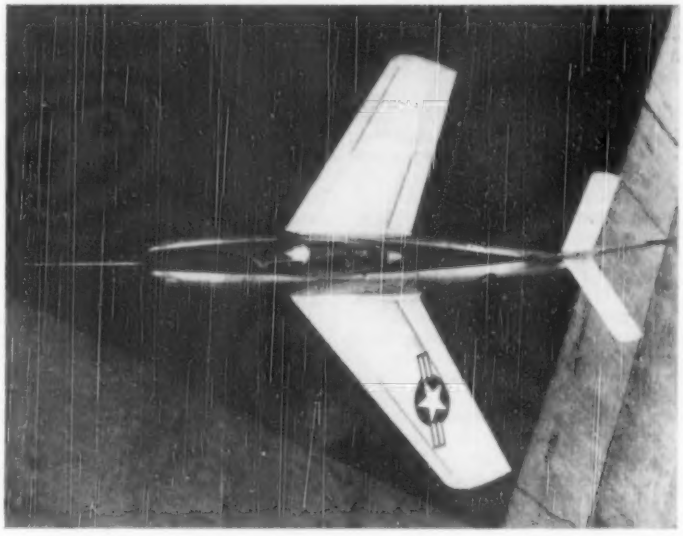
The plane is powered by an Allison J-35-25 turbojet engine with a static thrust rating of 5200 lb., an increase of 6 percent over the J-35-17 engine presently powering the F-84E. There is no provision for afterburner installation on the YF-96A.

Maj. Gen. Kenneth P. McNaughten, Director of Training, USAF, disclosed during testimony on the 1951 Air Force budget that the plane probably will be slated for quantity production. He stated that the Air Force is planning to procure an F-96A mobile training unit out of 1951 funds. Ordinarily training units of aircraft are ordered only when a model is in sufficient quantity production.

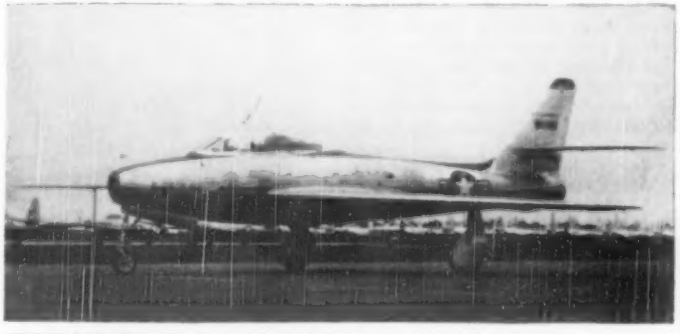
Dimensions of the YF-96A are: wing span 34 ft.; length, 38 ft.; and height, 14 ft. Maximum gross takeoff weight is 25,000 lb. 2000 more than the F-84E. The plane is 9 in. longer and 1 ft. 2 in. higher than its predecessor the F-84E. Wing design of the new plane includes provision for additional internal fuel storage. Republic said the wing design also would permit added external armament, such as rockets and bombs, and external fuel tanks.

The Air Force has stated that design performance characteristics for the new fighter exceed those of the F-84E. The plane was dismantled and flown to Muroc from the Republic plant at Farmingdale, Long Island aboard a Boeing C-97 and a Fairchild C-82. Oscar Hass, Republic Aviation Corp. Director of Flight will handle it during phase I tests at Edwards AFB.

Republic reported that the craft was being taxied under its own power within 167 days after the date the company's experimental shop received the first engineering drawing.



SWEPT WINGS and horizontal tail of YF-96A are emphasized here. Side view shows . . .



SWEPT RUDDER. Fuselage retains basic F-84 layout. Front view shows . . .

SHORTER WINGS of 34-ft. span, about three feet less than that of F-84E model.

AMC Streamlines Contract Procedure

Air Materiel Command has streamlined the administration of contracts for maintenance and modification of military aircraft.

Present AMC contract processing is simplified under a directive which raises seven USAF procurement field offices to liaison status between contractor and Air Force.

Under the program, field offices assume complete responsibility for receiving and evaluating applications for initial entry and continuous status on lists of qualified maintenance contractors. Then they forward lists to AMC headquarters for final approval and publication in a master list of qualified contractors.

Field boards for evaluation of contract applicants within each field office are charged with continuous revision and reprocessing lists as well as the addition of new applicants as qualified. At the same time field offices are charged with completing all necessary preliminary work in connection with bids, negotiations, etc.

Prospective contractors still must meet rigid qualifying criteria as to financial responsibility, experience, facilities, and accounting policies, etc., but elements of uncertainty, unnecessary costs and delays are expected to be curtailed by the decentralization. Contractual facility needs are in five categories:

- **Liaison Aircraft** (fabric-covered, single engine).
- **All-Metal Aircraft** (single-engine).
- **All-Metal Aircraft** (twin-engine) up to and including C-45, T-7, T-11, etc.
- **C-47 Through C-54** and similar aircraft.
- **Very heavy** multi-engine aircraft (B-29 and larger).

Tichenor Dies

Frank A. Tichenor, widely-known aviation editor and publisher, died at his home May 4 following a short illness. He was 69.

Mr. Tichenor became active in aviation following his acquisition of Aero Digest magazine in 1922. In later years he published The Sportsman Pilot, and A Letter to Airmen.

He also acquired publications in other fields, including The Spur, The Port, and The New Outlook.

He was a founder and past president of the Wings Club, an honorary member of the Early Birds, president of the Civil Air Patrol League, a member of the Institute of Aeronautical Sciences, and a member of the advisory committee for aeronautics of the Department of Commerce.

RCAF Orders Ten CF-100 Fighters

USAF may buy a few of Avro Canada's all-weather twin jets to evaluate against the F-89 Scorpion.

The Royal Canadian Air Force has placed contracts with A. V. Roe Ltd. for ten of the Canadian-designed and built CF-100 two-place, all-weather jets.

The twin-jet fighter plane made its U.S. debut last week, when it was flown for U.S. brass and foreign military observers at Andrews AFB, Md.

Indications in Washington are that USAF may order a small number of the Canadian fighter to evaluate its characteristics against its American counterpart, the Northrop F-89 Scorpion, and to bolster agreements signed by nations under North Atlantic Treaty and Mutual Defense Assistance Programs.

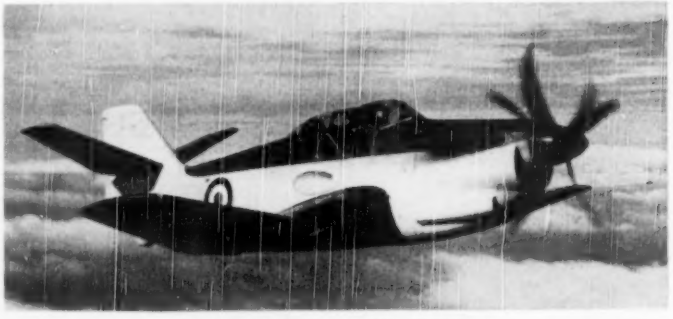
The plane is 52¼ ft. long, with a wing span of 52 ft. Height is 10 ft. 7 in. Equipped with a tricycle landing gear, the plane is of all-metal construction and weighs approximately 27,000 lbs.

Nose portion carries night intercept tion radar, four cannon and a rearward-folding nose-wheel leg. Crew of two is protected by an optically flat cannon-proof windshield and a one-piece canopy. Fuel is carried in tanks situated behind the rear crew member.

The wing of the CF-100 has no dihedral. The empennage features a high tailplane. A straight forward fin and rudder are employed.

Twin Rolls-Royce Avon engines developing 7500-lb. static thrust power the CF-100, but production models of the penetration fighter are scheduled for Canadian-designed Avro Orenda axial-flow turbojet engines. The engines are mounted above the wing-root on either side of the fuselage.

The plane was designed to meet Canadian-U.S. joint defense long-range night fighter requirements without duplication of aircraft manufacturing in Canada or in the United States.



BRITISH ASW COMPETITORS

Two new British turboprop planes designed for anti-submarine warfare undergoing preliminary flight tests are the Fairey 17, powered by an Armstrong Siddeley Double Mamba turboprop unit, driving counter-rotating propellers, and the Blackburn Y.A. 5, now using a Rolls-Royce Griffon piston engine as a temporary powerplant pending a later turboprop installation. Inverted gull wing and exhaust outlets for the turboprop engines in the sides of the fuselage are interesting points in common for the two-place sub-hunters. The double engine unit and contrapropellers give advantage of twin-engine operation. Either Mamba unit can be used alone, if necessary.

Automatic Control of Air Traffic Far Off

A Massachusetts Institute of Technology research engineer has warned that automatic air traffic control is still 15-20 years away.

Much more study and development work must be applied to large-scale digital computers (mechanical brains) used in the automatic traffic control systems, C. R. Wieser told an American Institute of Electrical Engineers meeting recently in Providence, R. I. He said reliability of computers must be improved through better vacuum tubes and components, and invention of new circuit elements.

At present, Wieser declared, large-scale digital computers which contain over 1000 vacuum tubes or relays are in the early stages of development, and the machines which have been completed are generally regarded as experimental. "Application of computers is a large field which so far has only been nibbled at the edges."

► **Two Types**—Wieser explained that there are two control systems which can use the high-speed digital computer. One consists almost entirely of information processing, where the logic is simple.

The second system covers control of several interdependent quantities where the logic is more complex—such as automatic control of air traffic. This requires computation of control instructions for up to 100 aircraft at a busy airport.

The MIT engineer said that speed may be the deciding factor in using the first type of control. But the factors in the second type are so complex and require such fast information processing that the digital computer is more than a competitor for the overtaxed human technician—it is a necessary replacement.

As Wieser sees it, the jet airliner will probably be the straw that breaks the human traffic controller's back. He said the job of developing digital computers to the stage where they are ready for commercial use is comparable in magnitude with the effort put into wartime development of radar.

Great Lakes Radar Fence on the Way

Newest link in USAF's five-year radar-fence building program will be constructed in the Great Lakes industrial area.

This latest radar defense panel will consist of installations at Mason City, Iowa; East Farmington, Elkhorn, Wis.; and near Duluth, Minn. The proposed radar sites represent USAF's first public admission that it is establishing inner-U. S. defense radar nets. Air Force officials say the panel will be linked with the already-established air defense zones of the Pacific Northwest and North Atlantic seaboard.

The disclosure was first made during congressional hearings on the subject. It was later confirmed by the Air Force, but detailed information in connection with the new sites was declared "highly secret."

The air defense zone, North Atlantic seaboard, 200 miles offshore, extends from the northernmost tip of Maine, southward to Norfolk, Va. Any unidentified aircraft in this area will be intercepted and challenged by USAF fighter planes.

The air defense zone, Pacific Northwest, extends from the Canadian border southward to a point on the Pacific Coast opposite North Bend, Ore. The defense boundary runs eastward to Superior, Mont. Plans are under way to extend the defense zone southward to Lower California. It is expected to be in operation by January 1, 1952.

Eventually, the entire United States will be blanketed by similar "defense zones" established to guard against surprise air attack from any quarter. For the present, however, the zones are being made workable only in strategic industrial areas—and primarily in areas where atomic energy developments are under way.

Outer radar defense sites are under construction at Murphy Dome and Fire Island, Alaska. Others, either under construction or being planned jointly by Canadian-U. S. defense establishments, will stretch across northern polar wastes from Atlantic to Pacific.

Subsidies Benefit Towns, Not Airlines

"Need" mail pay to air carriers is largely a subsidy to the small communities which they are required to serve uneconomically and not to the carriers, Sen. Edwin Johnson (D., Colo.), chairman of the Senate Interstate and Foreign Commerce Committee, reported to the Senate Appropriations last week.

Johnson's report summarized an extensive study by his committee, made at the request of the appropriations group which has demanded separation of mail pay from subsidy.

Among government and industry representatives, Johnson stated, "agreement was general that airlines carrying only a long-haul business and servicing only a few high-density points could operate profitably without subsidy.

He recommended legislation separating subsidy from compensatory mail pay and earmarking it on a community-by-community basis. All other separation proposals have contemplated subsidy payments on a carrier-by-carrier basis. Under Johnson's plan, communities, instead of air carriers, would be designated as "government subsidized."

AFTERBURNERS BOOST SCORPION'S CLIMB

Afterburners appear to be the new style for U. S. fighter planes and the Northrop F-89 is no exception. Added thrust is expected to up Scorpion's rate of climb. Note added large fairing under body between two closely spaced axial-flow jet engines.

PRODUCTION

Lear Activity

Company modifies plant at Grand Rapids, Mich., for avionics output.

Lear, Inc.'s profitable balance sheet for 1949—$510,496.59 net profit on sales of $7,368,000—reflects the company's activity in the avionics field.

Lear is modifying a portion of its Grand Rapids, Mich., facilities to handle its Air Force contracts for automatic pilots and gyroscopic instruments.

A completely air conditioned, dust-free manufacturing and industrial assembly area has already been completed. Tooling and initial production is set for the second part of this year with peak production planned for early 1951.

Contracts awarded to date and under negotiation are scheduled to assure deliveries of both products through entire 1951. Orders now on hand total $4,600,000. Deliveries of a new model automatic direction finder were slated for last month. Development and production engineering studies are bringing manufacturing cost down to a point where the sales price will be 54 percent of that of the prior model.

Last year, the electro-mechanical operations accounted for most of Lear's $7,368,000 in sales, increasing 42 percent over 1948. The Romec division's average monthly sales last year showed an increase of 133 percent over the previous year.

At the year end, Lear had a total of 1275 employes, compared with 880 for 1948. Research and development followed along several lines:

• **LearCal** missile controls design group has developed a magnetic modulator for military and commercial applications. Other programs include a power aileron control system for jet aircraft and a miniaturization program for military aircraft radio equipment.

• **Romec division** is doing qualifying tests of newly designed pressurization and camera vacuum pumps, pressurization being investigated up to 50,000-ft. altitudes. Two radar pressurization pumps have been produced and approved.

• **Grand Rapids division** delivered two units of an automatic pilot including a new link for automatically bringing an airplane into an airport during bad weather. This equipment has been installed in an Air Force jet airplane and in a light bomber. The former installation is believed to be the first of its kind.

New product development at Romec includes a new line of ac, dc, and high frequency motors, special motors for Romec pumps, quick-stopping clutching and braking arrangements, new actuators, and modernized models of older type actuators.

Foreign Licensees Make British Engines

British achievements in turbojet design are paying off in licensing arrangements with foreign producers. Agreements are in force covering five turbojet engines and one piston engine.

Pratt & Whitney holds licenses to produce the Rolls-Royce Tay and Nene turbojets, rated at 6200 lb. and 5500 lb. static thrust. The Turbo-Wasp engine, based on the Nene, is the first turbojet to be approved for civil use in the United States.

The Argentine government is licensed to produce the Rolls-Royce Derwent turbojet and the Armstrong Siddeley Cheetah, air-cooled, piston-powered engine; Sweden holds licenses for de Havilland's Goblin and Ghost; and Fabrique Nationale, Belgian engineering company, is licensed to make the Derwent.

PRODUCTION BRIEFING

▶ **Boeing Airplane Co.** has merged Seattle and Wichita engineering divisions to expedite interplant coordination. Harold W. Zipp became executive engineer under the new arrangement, directing engineering administration and staff activities for Wichita. George C. Martin has been named chief of the combined Seattle-Wichita B-47 Stratojet projects . . . Seattle engineering flight test facilities and operations are being concentrated on the northwest corner of Boeing field.

▶ **Lockheed Aircraft Services'** Burbank base has received a contract from Slick Airways for fabrication of 1000 C-46 empennage assembly parts.

▶ **Solar Aircraft Co.**, San Diego, is completing addition of nearly 75,000 sq. ft. of covered area which will bring plant and administrative offices total to 433,000 sq. ft.

▶ **William R. Whittaker Co.**, Ltd., Los Angeles, has acquired entire capital stock of Saval, Inc., makers of high pressure fluid control valves. William R. Whittaker became head of Saval; L. S. Barksdale (former Saval president) remains in that organization as vp. and general manager. The organizations will continue to carry on separate production and sales operations.

▶ **Hamilton Standard** division of United Aircraft has started production of 100 wind-tunnel blades for Cornell Aeronautical Laboratory, Buffalo, N. Y., and the Southern California Cooperative Wind Tunnel, Pasadena, Calif. Blades are of solid aluminum alloy, seven feet in diameter. Each weighs more than 200 lb.

▶ **Glenn L. Martin Co.** has concluded arrangements with Loewy Engineering Co., Ltd., London, to handle introduction into Europe and other export territories of Martin's Marform metal forming process. Complete presses and equipment for incorporation into existing presses will be built by Loewy at the company's plant, Light Machines, Ltd., Yeovil, England.

▶ **The Thompson Co.**, Los Angeles, reveals that it has been granted patents on its Refrasil lightweight high-temperature insulation material used for aircraft firewall, wires, and turbojet tail-pipe and tail-cone installations.

▶ **Hoffman Radio Corp.** has set up a new special apparatus division in a new plant at 3415 South Grand Ave., Los Angeles, and will handle all military work in this 22,000 sq. ft. addition. Production of URC-4 miniature air-sea rescue receiver-transmitters is scheduled to start this month.

▶ **Frank Ambrose Aviation Co., Inc.**, Flushing, N. Y., has established a branch warehouse at Miami International Airport.

▶ **Jack & Heintz Precision Industries**, Cleveland, estimates that 75 percent of its total volume of business is aircraft products, ranging from starters to power control systems. The company's aviation engineering department and research labs are occupying leased quarters formerly occupied by Jahco, but which were sold to Universal Wire Spring Co. during 1949. Jahco's net profit for the first quarter of this year is given as $245,850. Net loss last year was $2,701,793.

▶ **Texas Engineering & Manufacturing Co., Inc.**, Dallas, Tex., has received a USAF contract for maintenance inspection and overhaul of 60 additional Douglas C-54s, raising to 435 the number of this type overhauled by TEMCO for USAF and MATS.

▶ **Wright Aeronautical Corp.** has received orders totaling about $3 million for Cyclone engines to power North American T-28s, Grumman SA-16s and Lockheed Constellations. Deliveries will begin late this year.

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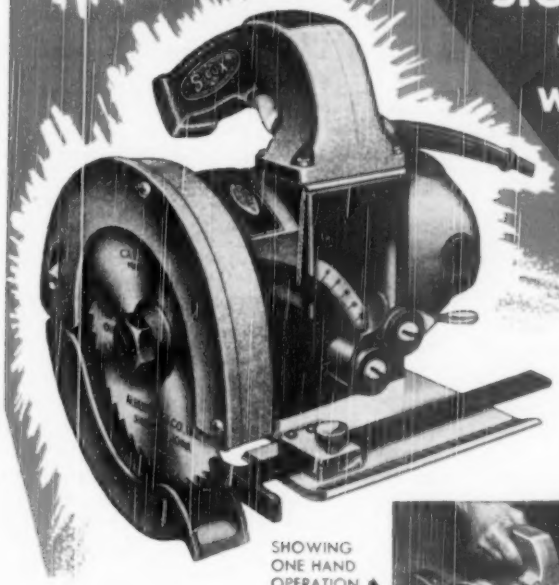
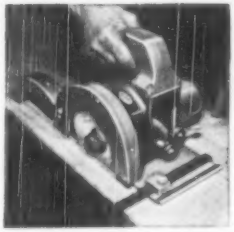


SHOWING ONE HAND OPERATION



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BASE ADJUSTMENT: Vertical 0 to 2".
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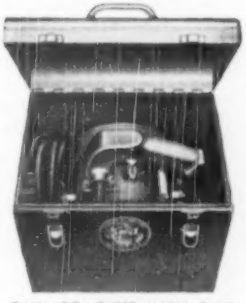

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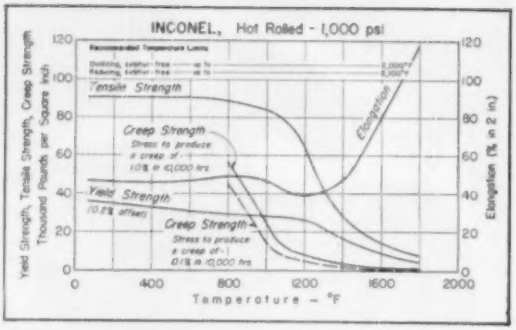
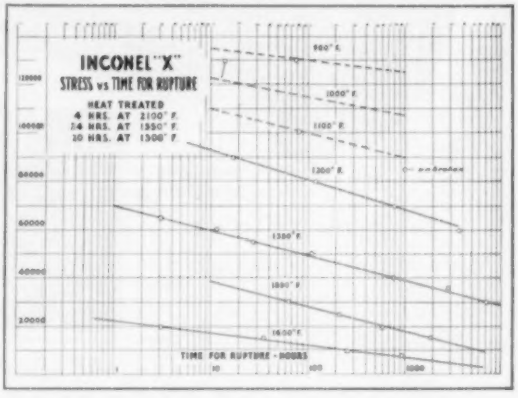


INCONEL provides an economical answer to high-temperature metal problems where moderate hot strength is adequate.



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Transport Best Bet: Axial-Flow Jets

Turbojets now offer speed and simplicity; yet to come is cure for 'fuel hunger.'

By Winnett Boyd*

Why people want to go faster and faster, particularly when traveling by air, is anybody's guess. The fact remains, however, that there is a desire for speed on the part of the traveling public, provided they can travel fast in safety and comfort, and to achieve this end they are prepared to pay a premium for it. This desire is well-illustrated by modern automobiles, premium-fare trains, and luxury trans-Atlantic liners.

If a panel of technical experts were to sit down and try to determine the best type of automobile for the general public they would undoubtedly lay great emphasis on cheap transportation. Indeed, it is entirely likely that they would lay too great emphasis on this factor and insufficient emphasis on the rather intangible factors such as the public's desire for speed, comfort, and external show.

The result would be that this panel would probably conclude that the car the average American and Canadian wants is a replica of the midget type European auto. We all know that this is not true, since small cars have been received very questionably on this continent. In other words, what the average North American wants in an automobile is comfort and even luxury, speed, get-away, external showiness, etc., and he is quite willing to pay a substantial premium to obtain it.

The same holds true of railway transportation. Premium-fare, high-speed luxury trains were introduced on this continent some time ago, and were an immediate success. At the present time it is difficult to get a ticket on them because of the queue. Similarly, luxury trans-Atlantic liners are always booked to capacity, whereas, it is relatively easy to get a cheaper passage on a smaller boat which is neither so fast nor so luxurious.

All of this does not explain why the general public likes speed but merely recognizes the fact by citing a few well-known illustrations. Along with this, the jet idea has caught the fancy of the public and, it being synonymous with speed, it is not hard to guess which aircraft the average traveler would choose in going from A to B if he were choosing between a turbojet transport and one of those old fashioned things that uses something akin to paddle-wheels.

Having recognized the desire of people to travel fast, the next thing to do is to try to establish just how fast the public is prepared to travel. The only answer appears to be a repetition of a previous statement—the public will travel just as fast as it can, provided it can do so with safety and comfort. Thus, in considering air transportation after 1955, the speed ranges of different types of aircraft must be taken into consideration. In doing this, the time element must also be clearly kept in mind, since this paper endeavors to establish the case for the turbojet in air transportation after 1955, that is, starting in January, 1956, which is a little over 5½ years from now.

► **Cruise-Speed Classes**—Generally speaking, the cruising speeds of transport aircraft can be divided into three categories for the sake of this discussion—cruising speeds of 500 mph. or better, 400 to 500 mph., and up to 400 mph.

It can quite easily be shown by technical arguments alone that no other form of aircraft can compete with the turbojet in the cruising speed category of 500 mph. or better. However, for the purpose of this discussion and bearing in mind the time element, it is not thought that this category is too important, since, if it were, there would be no discussion at all. Before dropping it, however, it is well to note that there already exists a long-range turbojet transport that cruises at almost 500 mph. and thus it will not be possible to brush aside peremptorily this category in any discussions on this subject which take place a few years hence.

In the cruising speed category between 400 and 500 mph. the case for the turbojet vs. the turboprop and piston engine aircraft has to be argued. Again it must be recognized that there exist two turbojet transports in this category—the one mentioned and a short-to-medium range craft which cruises at 430 to 460 mph. depending on conditions. While it cannot be argued that jet transports should be adopted now merely because they are available, the fact that two companies have gambled on them, and airlines

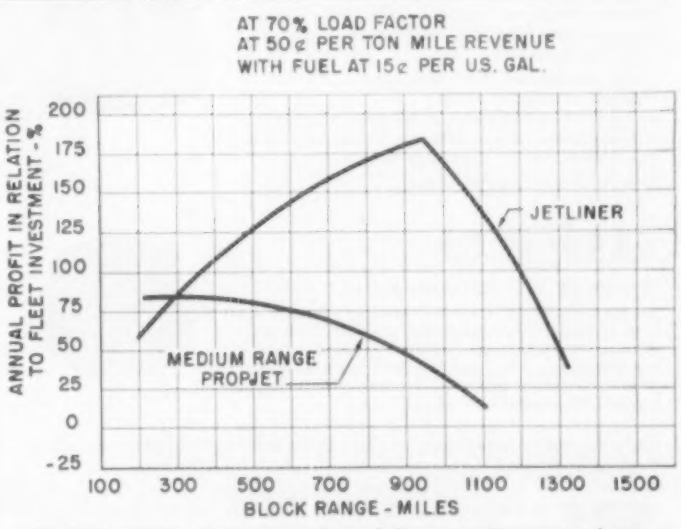

Fig. 1. Comparative earning power of Avro Jetliner vs. medium-range turboprop.

* Assistant chief engineer and chief designer, Gas Turbine Engineering division, A. V. Roe, Canada, Ltd. Paper presented at Society of Automotive Engineers National Aeronautic Meeting, Apr. 17-20, New York City.

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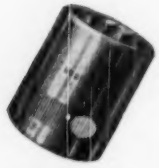

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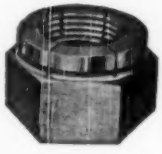

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are buying them, is certainly thought-provoking.

In the category of 400 mph., or less, the turbojet cannot be considered for numerous reasons which need not be further discussed. However, as a large number of transport aircraft will still be operating in this cruising speed range after 1955, it is here that the turboprop will have to "battle it out" with the piston engine for supremacy in the transport field.

▶**Piston Engine Travel**—Having recognized that the public wants to travel fast, in safety and comfort—and this is important—and having taken full cognizance of the time element involved as well as establishing three logical cruising speed categories, this paper now enters the field of the discussion so aptly and completely described by two words "with what."

Although it is doubted whether anyone has seriously considered the possibility of piston engine transports flying at cruising speeds of 400 mph. or better, it might be well to consider the subject briefly. The two most potent arguments against such aircraft concern the powerplant and passenger comfort. Since there are no piston engines presently available of sufficient power to operate such a transport, it is unlikely that there ever will be, because it is a well-known fact that military contracts are required for defraying the extremely large development costs of such engines and it is doubtful if any such contracts will be forthcoming in the future.

The comfort in piston engine transports, while satisfactory, if one doesn't know any better, is no match for that in turboprop and turbojet craft. Although it could conceivably be improved by better upholstery, better seats, more attractive internal furnishings and prettier stewardesses, these improvements would be more in the nature of remedies than cures, since it's the engine noise and vibration which causes the trouble.

▶**Turboprop Views**—Turboprop transports can undoubtedly fly economically in the 400 to 500-mph. cruising speed category and thus will be competing directly with the turbojet transport. Also, they are quiet and vibration-free, so the turbojet cannot claim an advantage in this respect.

However, in considering the position of the turboprop in this speed range the time element must not be forgotten. That is, air transportation after 1955 is the issue at stake and thus the discussion centers primarily around the advances and developments of the next 5½ years. Although it is appreciated that two turboprop transports are now flying, they are both short-to-medium range craft and have maximum cruising speeds of only 305 to 315 mph. This is somewhat better than existing piston

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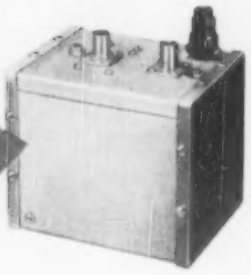

These two new units are indicative of the engineering leadership Bendix-Pacific has established in the field of electronics.

The new 421250 Transmitter supplements a complete line of telemetering components in the Bendix-Pacific FM/FM subminiature telemetering systems and has a nominal power output of 2 watts. The total weight, including the case, is only .845 pounds and it measures 2" diameter by 5⅛" long.

The 421250 Transmitter can be tuned over the frequency range of 215 mc to 230 mc and is adaptable for use with current fed or voltage fed antenna systems. It has a line of sight range of up to 40 miles and may be used to drive the 421230 Power Amplifier.

The Bendix-Pacific 421230 Telemetering R. F. Amplifier has a nominal power output of 15 watts which provides adequate power for line of sight ranges of 40 to 100 miles. The tuning range matches that of the 421250 Transmitter. The total weight, including the case, is only 1.75 pounds.

The two transmitting units described above exemplify the building block method of telemetering system assemblies. Through the use of standard Bendix-Pacific components, the purchaser can readily assemble an instrumentation system exactly suited to his specific needs – thus effecting the utmost economy in volume, weight and cost.

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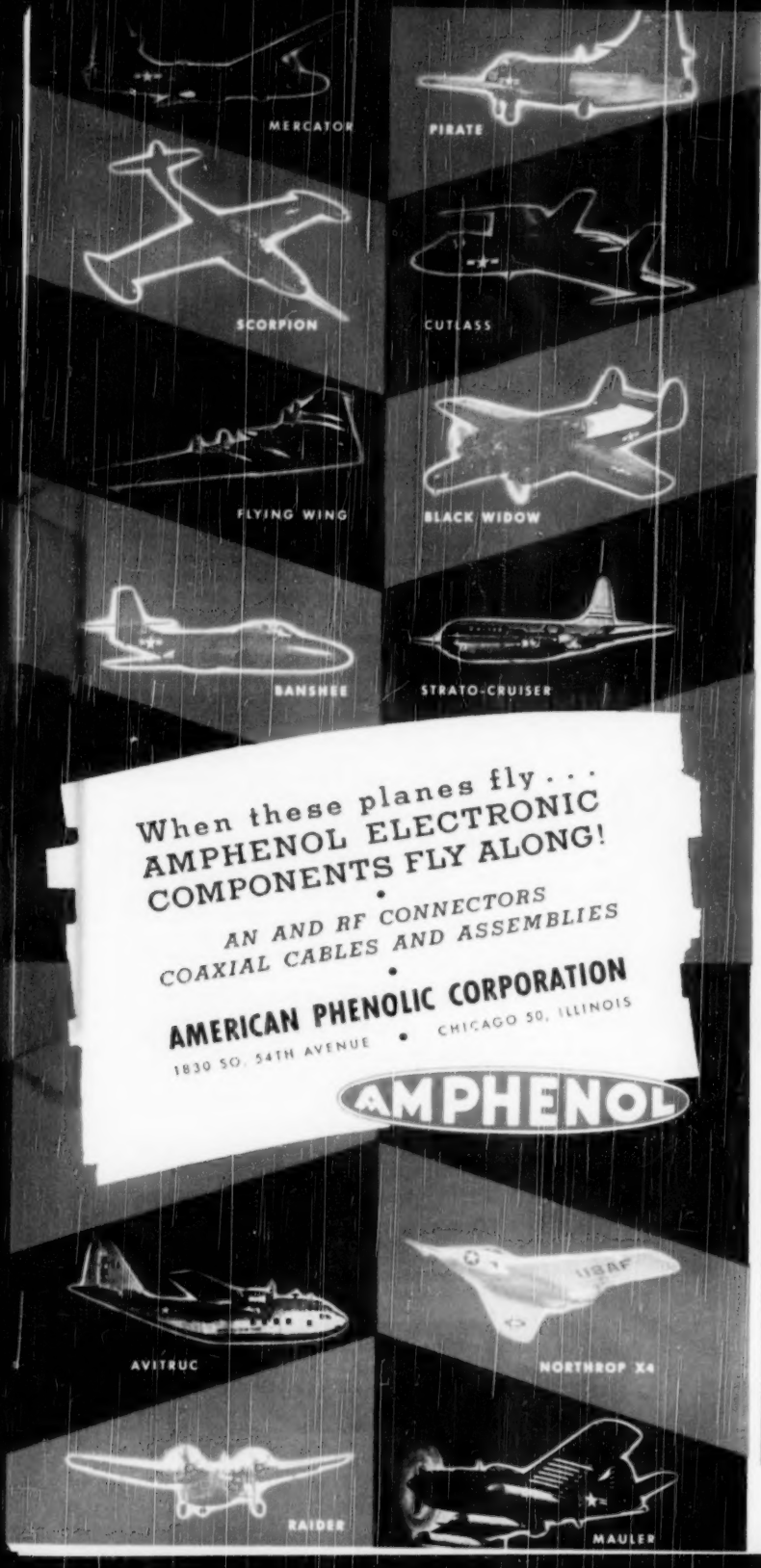


engine craft but is hardly enough to make them really catch the eye of the public.

As mentioned previously, turboprop transports will have to vie with piston engine transports in the cruising speed category below 400 mph., but, and this is the first time it has been mentioned, they will also have to compete economically with turbojet transports which will be flying at considerably higher speeds.

▶ **Turbojet Outlook**—I have stated that two jet transports are now in existence, and developed the theme that the public wants speed with safety and comfort, is willing to pay a premium for it, and that the jet idea has caught the public fancy. All of this is extremely important, since it means that turbojet transports could be introduced today on premium fare runs and would be an immediate commercial success. Besides this, there is another, and very important parallel, between the turbojet transport and the streamlined diesel train. That is, the latter was introduced as a premium-fare passenger train but proved so economical to operate that diesels are now being used for quite a number of non-premium runs, and are even being used for hauling freight.

Indeed, because of the great economy of diesels—or conversely their greater net earning capacity—some railroads are finding it advantageous to scrap existing steam equipment, even though it is only partially worn out, and replace it with diesels. Likewise, turbojet transports undoubtedly will be first adopted for premium-fare runs but will soon demonstrate their economy and will subsequently displace their slower turboprop and piston engine rivals on a large majority of the "bread and butter" runs. As in the case of the railroads, this process of replacement may necessitate the premature retiring of existing aircraft, replacing them by turbojets, simply because it is the most economical thing to do.

It is difficult to appreciate the reticence of the North American airlines towards turbojets, because the first one that adopts them will force the pace for the others, and after they have all taken the "plunge" they will find that the water is more pleasant then they expected—indeed, extremely pleasant to the tune of considerably greater earnings on their investment. Along this line it might be mentioned that a Canadian airline has already ordered two long-range turbojet transports, scheduled for delivery in 1952 and should thus be in service in '53.

▶ **Basis of Comparison**—All these arguments do not deal with the detailed technical advantages of the turbojet transport over its rivals. But they are very important and I am inclined to think that they may not have been

Table I—Powerplants in Jet Transports

Aircraft (engines)	Dry T.O. Thrust-lb.	Minimum S.F.C. lb./lb. thrust/hr.	Initial Overhaul Life-Hr.
Avro Jetliner (R. R. Derwents)	3500	1.02	500 (Preliminary)
De Havilland Comet (De H. Ghosts)	5000	1.02[2]	600[2]

1. Aircraft Engines of the World, 1948—Paul H. Wilkinson.
2. Since this figure was not available for the Ghost, the Goblin figure has been used, as the former is, for most purposes, a scale-up of the latter.

Table II—Probable Characteristics of Commercial Turbojet Engines in 1956

Engine type	axial flow
Dry T.O. thrust	up to 7000 or 8000 lb.
Minimum S.F.C.	0.87 to 0.92 lb./lb. thrust/hr.
Overhaul life	1000 hr. (equiv. to 1500 hr. for piston engine)
Specific weight*	0.35 lb./lb. T.O. thrust
Specific frontal area*	1.33 sq ft./1000 lb. T.O. thrust

S.F.C. of unity or less from 35% thrust up to full thrust

* Specific weight and frontal area include starter and firewall, engine gearboxes, fuel pumps, fuel filter, controls and burners, oil tank, pumps and filter, trunnions, igniter plugs and coils, drive for A/C accessories gearbox and tacho generator.

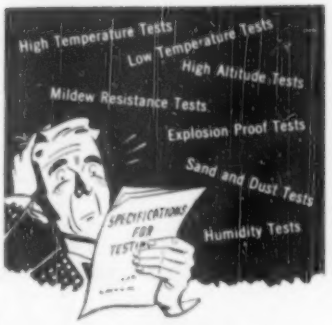
given sufficient emphasis in the past. However, the turbojet transport will have to be a solid money-making proposition, despite all its attractions for the public, if it is going to be adopted. And it will have to be at least as safe as existing planes. Thus, the technical advantages of the turbojet, both present and future, from the economic as well as the safety point of view, have to be argued.

Many competent authorities have investigated the economics of the turbojet transport, and despite the engines' rather prolific thirst for fuel, results have always been favorable. Very careful calculations have been made on this subject by the company with which I am associated and it has been found that the turbojet transport will economically out-perform many of its slower turboprop and piston engine rivals on a very large number of airline routes.

These statements will probably evoke considerable discussion and criticism on the basis that turbojet transports have higher costs per ton-mile than conventional transports. This is correct, but the ton-mile basis of comparing transport aircraft is made obsolete by the advent of the turbojet just as are the existing planes themselves. In short, the cost per ton-mile was a satisfactory basis of comparison when aircraft speeds were about the same, but when the block speed of one aircraft is anywhere from 50 to 75 percent higher than the other, the proper criterion for comparing the economics of the two is the net unit earnings per ton-mile multiplied by the block speed. In other words, the airplane that flies faster will cover more miles in a given year, and although its net unit earnings may be smaller, its gross earnings per year will be greater. This is clearly illustrated in Fig. 1.

▶ **Present Characteristics**—It should also be noted that the calculations made for Fig. 1 took into consideration adequate allowances for stand-off and alternate airport and thus are particularly compromising to the jet transport with existing methods of traffic control. On this score, it has been clearly demonstrated that with optimum partial engine operation, the maximum stand-off endurance of turbojet transports is independent of altitude which, up to now, has not been clearly understood and always been used as a criticism of jet transports. This means, however, that in existing jet transports the pilot has to shut down some engines to realize maximum stand-off endurance at low altitude and re-start them before landing, but this procedure will be largely eliminated in the future by engines which have much flatter S.F.C. vs. power curves.

Because the turbojet is an attractive economic proposition with its present powerplants it might be well to list the main characteristics of the engines presently being used so that the future



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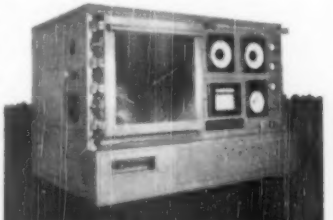

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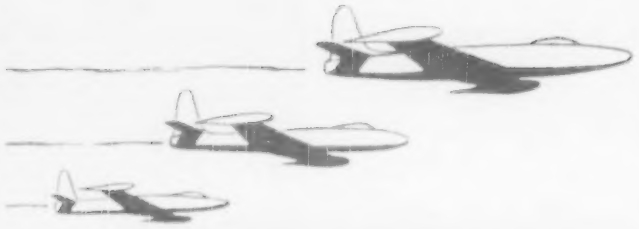

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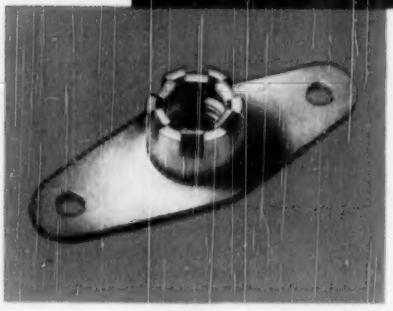

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advantages of the turbojet transport consequent upon engine improvements can be fully appreciated. These are shown in Table I.

In addition to the characteristics listed in Table I, both of these engines do not have very flat S.F.C. vs. thrust curves. While any disadvantages associated with this characteristic can be largely overcome by prudent partial engine operation, a flat S.F.C. vs. thrust curve is a great asset from the pilot's point of view, particularly during stacking, as flexibility in the choice of cruising speed at various altitudes is available with no deterioration in endurance and without resorting to engine shutdowns.

Since the turbojet transport is economically competitive with existing engines which, admittedly, have high fuel consumptions, it is interesting to see what improvements will result from lower fuel consumptions. In this respect the turbojet transport is in a class by itself, since it becomes a very attractive proposition when engines with, say 12 percent lower fuel consumption, are available. This is clearly illustrated in Fig. 2, where the improvement is compared to that of a turboprop transport.

This advantage of the turbojet transport, from the point of view of future development, is directly related to the fuel consumption of present-day engines vs. the fuel consumption of engines available in 1956. Thus, this rather large "thirst" of the present-day engines may be almost looked upon as an asset in disguise because it has forced the designers of jet transports to really scratch their heads to get the most out of them.

► **Commercial '56 Engines**—What kind of performance can we expect from jet engines in January, 1956? In this respect I am going to make two predictions, one for engines completely developed up to the point where they may be considered reliable commercial products, the other for development engines doing a certain amount of service flying. One always steps on very shaky ground when one indulges in predictions but it is a necessity to illustrate the great potential of the turbojet transport.

Table II lists the probable characteristics of completely developed turbojet engines in 1956. It will probably be assumed by jet enthusiasts that these predictions are unduly conservative and thus a few words of explanation are in order.

In the first place, although large engines of the type indicated will be available, smaller ones will also be available. But while they will have about the same S.F.C. and overhaul life, they will have progressively larger specific weights and frontal areas reaching about

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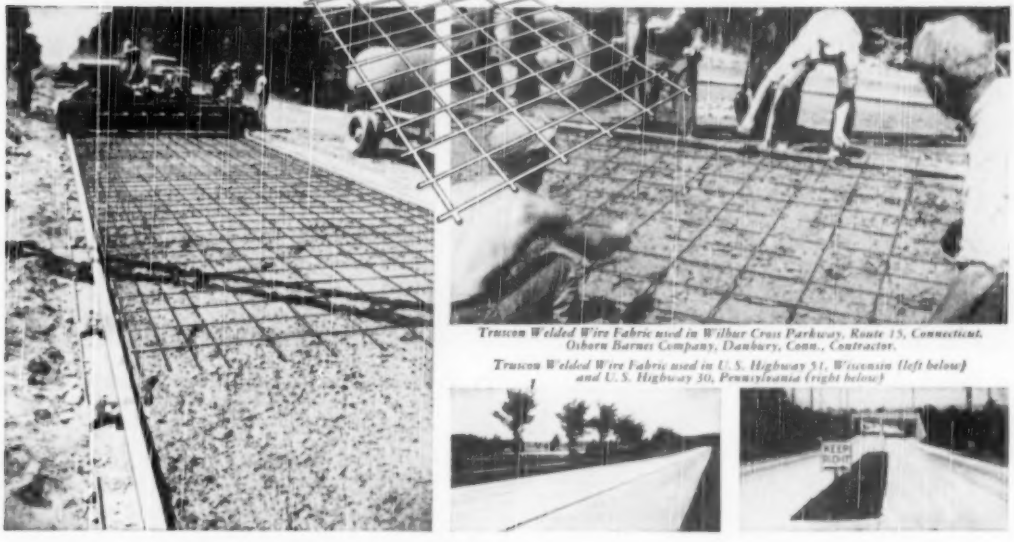

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In the second place a little reflection on the time required to develop engines from the moment they first run indicates that it takes about 4 years of intensive work to get a really reliable engine. Thus, any engine that will reach this stage in January, 1956, will have to be running now or by January, 1952; that is, within the next 20 months.

▶**Overhaul Life Details**—The 1000-hr. overhaul life looks like a tremendous achievement, but I will describe later the solid foundation on which this prediction is based. In any case, the significance of 1000 hr. overhaul life in a jet engine should be thoroughly understood.

Since a turbojet transport will travel anywhere from 50 to 75 percent farther than a piston engine transport in every hour, this overhaul life is equivalent to 1500 to 1750 hr. for a piston engine. Furthermore, it is not thought that there will be major replacements during the first engine overhaul, because it is expected confidently that these will be limited to the main bearings, the fuel pumps, a few nozzle guide vanes and turbine blades, the insulating blankets and perhaps the nozzle box liners.

The 2000-hr. overhaul is expected to be a complete engine rebuild and will include the replacement of all gears and bearings, blades, nozzle box liners, tailcone, etc. In other words, the majority of the working parts will be replaced. This will then put the engine in shape for another 2000 hr. with an overhaul at the midpoint. After this, that is, 4000 hr. total engine running (equivalent in miles to 6000-7000 hr. for a piston engine), it is expected that the second set of working parts will have been worn out and that the main castings, etc., will have deteriorated to where the entire engine will have to be discarded.

Engine maintenance between overhauls will probably be limited to fuel and oil filter cleaning, replacement of flame tubes or combustion chamber liners every 500 hr., replacement of some fuel and oil line hoses, and cleaning sparkplugs every 100 hr.

▶**Development '56 Engines**—When reliable engines as outlined in Table II are flying, development engines with somewhat better performance but lower life will probably be running on the test beds and flying experimentally both in and out of the services. It is expected that these engines will have the characteristics outlined in Table III.

So far, this paper has been concerned solely with pure jet engines, but for commercial work an adaptation of an attractive military engine, namely the ducted fan or by-pass engine, might be

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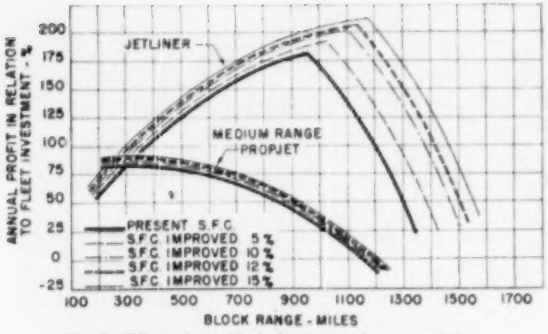

Fig. 2. Effect of specific fuel consumption on earnings.

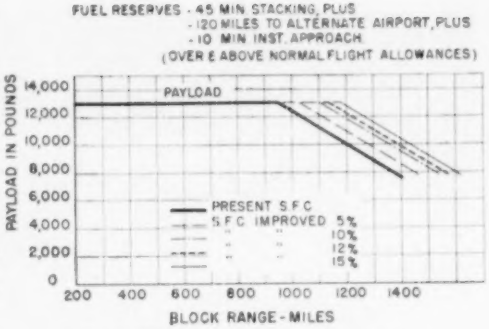

Fig. 3. Effect of fuel consumption on range.

attractive. In passing, it might be noted that the military version of such an engine will undoubtedly have an afterburner.

Although, it is thought unlikely in the extreme that engines such as this will be commercially available in 1956, they should be mentioned, if for no other reason, than to indicate that they have not been overlooked.

▶ **Simple Makeup**—Because of the relatively simple nature of the jet engine in comparison with complications of the piston engine with its connecting rods, valves, pistons, cams, propellers, etc., and the turboprop with its large reduction gear, propeller and "box of tricks" to maintain the correct relationship between engine speed, propeller power and jet pipe temperature, the jet engine will undoubtedly be more reliable than its competitors. It is on this fact, as well as performance of these engines to date, that their long and reliable life can be predicted.

In other words, the jet engine, complicated though it may seem to the non-technical person, is considerably simpler than the turboprop or piston engine and thus sticks closer to the simple fundamental that to do a given job the simplest mechanism is always the best. This better reliability will be reflected, not only in safety, but in the actual cost of operation. The turbojet transport of 1956 will be cheaper to operate than existing ones, not only because of better fuel economy but because of very much improved engine reliability and considerable longer periods between overhauls.

▶ **Orenda Data**—To indicate the degree of reliability that jet engines are now achieving and to substantiate the above statements, it might be well to tell you of a remarkable endurance run which was done by the first Orenda engine that was produced by the Avro Canada firm.

Without a major overhaul, this engine ran for 784 hr. during which it completed the 50-hr. flight clearance or 25-hr. special category test, as well as the 150-hr. endurance or type test of the U. S., the U. K. and Canada—one right after another. It also completed 209 hr. of miscellaneous running including numerous accelerations and stalls, since we were trying to get the correct setting on the acceleration controller. All of this running was done without derating the engine in any way and the endurance run was only termi-

Table III—Probable Characteristics of Development Turbojet Engines in 1956

Type	axial flow
Dry T.O. thrust	up to 8000 or 10,000 lb.
Minimum S.F.C.	0.80 to 0.87 lb./lb. thrust/hr.
Specific weight	0.32 lb./lb. T.O. thrust
Specific frontal area	1.25 sq.ft./1000 lb. T.O. thrust

Table IV—Characteristic Performance of deHavilland Comet

Max. gross weight	105,000 lb.
Runway length for T.O.	2175 yd.
Cruising speed	490 mph.
Normal seating capacity	36 passengers
Possible Flights	
(a) Stage Length (Prestwick-Gander)	2116 mi.
Payload (50% regularity)	8750 lb.
Payload (80% regularity)	5800 lb.
Allowances—50-mph. headwind	
—30 min. stand-off	
—395 mi. diversion (Gander to Goose)	
(b) Stage length	1750 mi.
Payload—(48 passenger version)	14,000 lb.
(This is based on 2000-yard runway limiting gross to 101,000 lb.)	
Allowances—30 min. stand-off	
—200 mi. diversion	
Note: Aircraft is economical down to stage lengths of less than 1000 mi.	
(c) Max. practical range	2645 mi.
Payload—(36 passenger version)	12,000 lb.
Allowances—30 min. stand-off	

Note: All of the above:

(a) Include an allowance for ground running, taxiing out, takeoff, climb and descent, navigational errors, airframe and engine variation and deterioration.

(b) Are based on actual measured performance and do not take into consideration any improvements, to either airframe or engine, which will be made during the development normally carried on during the early production program.

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nated when a member of the test crew accidentally dropped a bolt and a package of Schick injector razor blades into the intake. None of the engine blades were broken but leading and trailing edges were badly burred. The rest of the engine was in good shape and would have run considerably longer.

The only maintenance that was done during this endurance test was to replace certain lengths of flexible hose, fuel pumps after 500 hr., flame tubes or combustion chamber liners after 300 and 600 hr., and 6 nozzle guide vanes which were accidentally damaged. Takeoff J.P.T. was maintained at 700 C. as measured by stagnation thermocouples and a performance run which was done about 2 hr. before the accident, indicated that the takeoff thrust had only dropped by 75 lb. after all this running.

The engine was on the test stand from July 5 to Nov. 10, 1949. Allowing for a two-week plant shutdown, this averages out to approximately 7 hr. per day including Saturdays and Sundays. It might be mentioned that this average daily running could have been improved if it hadn't been for neighbors who strenuously objected to our running the engine at night or too early in the morning.

► **Run Data**—As further evidence that the Orenda has not been "babied" to get this reliability, here is a breakdown of all of our development running to date: 4.6 percent at takeoff thrust or better; 6.2 percent at climb (92 percent of takeoff thrust); 30 percent at maximum continuous cruise (81.5 percent takeoff thrust); and 46.3 percent at 65 percent of takeoff thrust and above. The balance of the running was done at powers below 65 percent of takeoff thrust.

The above endurance run was made on the third rebuild of Orenda No. 1. On the two previous builds, a total of 192 hr. was logged, so that nearly all of the engine components, including the main bearings, turbine blades, N.G.V.s, nozzle box liners, tailcone, tailpipe and, of course, all of the cold end of the engine, had run almost 1000 hr. when the accident occurred. With the exception of the blades, the remainder of the engine was in good shape and it is therefore going to be rebuilt and its running continued. Thus, in predicting 1000 hr. between overhauls with very few replacements, either between or during overhauls, the predictions are based on pretty good evidence.

A description of the two turbojet transports already flying seems to be in order.

The de Havilland Comet, a long-range plane, is designed for a normal seating capacity of 36 and has the performance outlined in Table IV.

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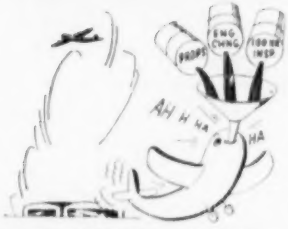

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Table V–Characteristic Performance of Avro Jetliner

Maximum gross weight	68,000 lb.
Runway length for takeoff	1360 yards
Cruising speed	up to 465 mph.
Normal seating capacity	40 to 60 passengers
Possible Flights	
(a) Montreal to New York	300 mi.
Payload	13,000 lb.
Block time	1 hr., 9 min.
Fuel reserves carried to permit	2 hr. flying +
(b) New York to Bermuda	800 mi.
Payload	13,000 lb.
Block time	2 hr., 12 min.
Fuel reserves carried to permit	2 hr. flying +
(c) New York to Miami	1100 mi.
Payload	11,000 lb.
Block time	3 hr., 12 min.
Fuel reserves carried to permit	60 min. stacking plus 120 mi. to alternate

Note: All of the above:
(a) Include allowances for ground running, taxiing out, take off, climb, descent, 7-min. maneuver prior to landing and taxiing in.
(b) Cruising and other performance figures have been substantiated by actual flight test.

The Avro Jetliner, a short-to-medium range craft, is designed for a maximum seating capacity of 60 and has the performance outlined in Fig. 3 and Table V.

▶ **Axial vs. Centrifugal**—It will be noted that both of these craft have one thing in common—they both use centrifugal engines. This is natural, since, with the exception of the U. S., there is no country which has had axial flow jet engines running for a sufficient period of time to develop them to the state of reliability required for commercial work. I am convinced, however, that the axial flow engine will gradually displace centrifugal engines for transports. The reasons for this are twofold.

First, the axial engine is potentially more efficient than the centrifugal, and even at the present time is achieving fuel consumptions substantially below those of the best centrifugal engines. Secondly, the smaller diameter of the axial engine will show up to advantage in the wing or "pod" type installations that will undoubtedly be employed in future turbojet transports.

The above covers, in a rather sketchy fashion, the case for the turbojet transport after 1955. However, it might be appropriate to make a quick review of the foregoing by drawing some conclusions. They are:

• The public is always demanding speed combined with safety and comfort.

• The jet idea has caught the public fancy and is considered synonymous with speed.

• Two jet transports—one long range and one short to medium range—are already flying.

• Airlines are already buying jet transports. In particular, one Canadian airline has ordered two of them.

• Airlines can economically adopt jet transports for premium fare runs and keep them booked to capacity.

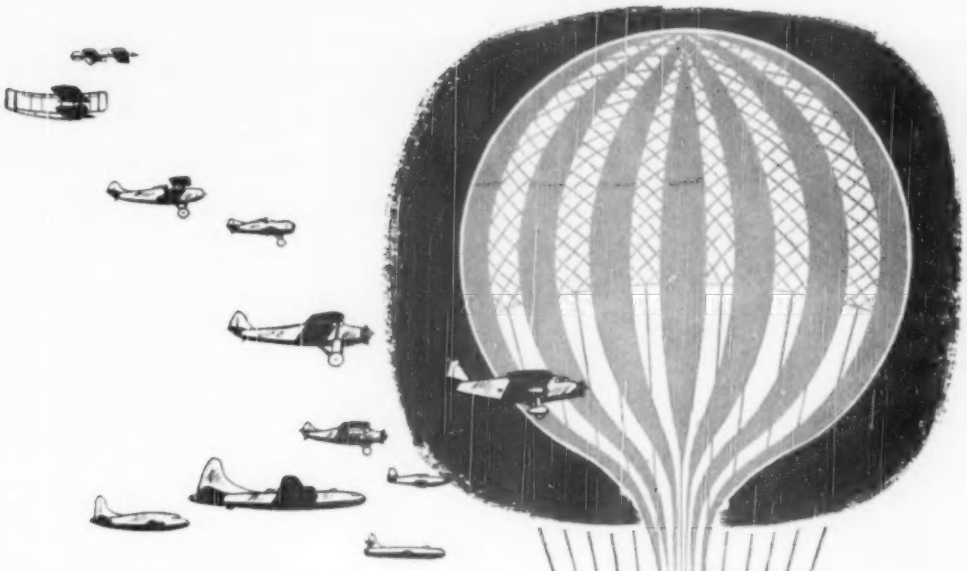
• The present "cost per ton-mile" basis for comparing the relative economics of aircraft with large differences in block speed is obsolete.

• Operation of jet transports will prove the makers' claims that they can economically outperform many of their slower speed rivals on many of the existing "bread and butter" runs.

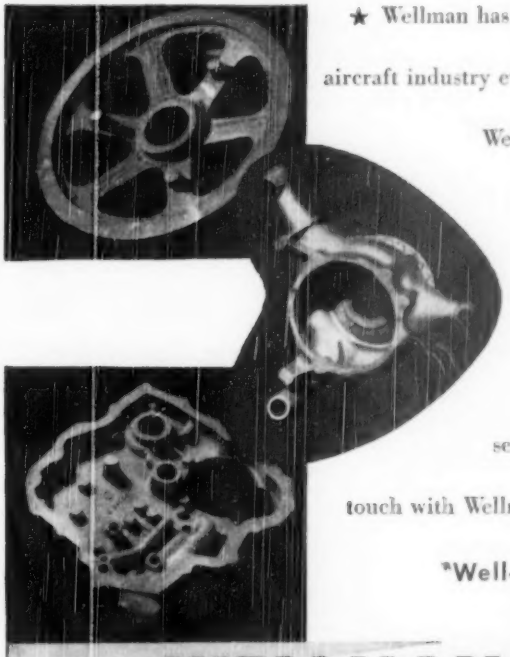
• Turbojet transports stand to gain enormously from future improvements in engine economy.

• The engines presently used in jet transports already have reliability and overhaul lives comparable to exceedingly good piston engines, judged on a mileage basis.

• The present development of jet engines indicates that in 1956 engines with at least 12 percent lower fuel consumption and 1000 hr. between overhauls will be available.



We've Been Up In The Air A Long Time



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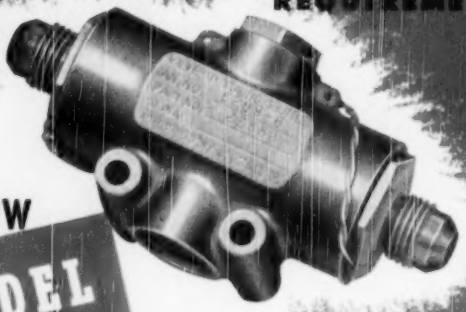
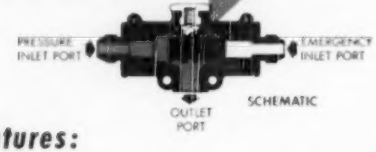


New ADEL

AN 3000 AND 1500 PSI HYDRAULIC SHUTTLE VALVES



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Study in Miniature

The behavior of aircraft during catapult takeoff from carriers is being studied by engineers at the Douglas Aircraft Co.'s plant in El Segundo, Calif.

Studies are being carried out with the aid of a miniature launching device which catapults model airplanes. These craft are built to exact scale and weighted to give the same moment of inertia and scale-weight ratio as a full size plane.

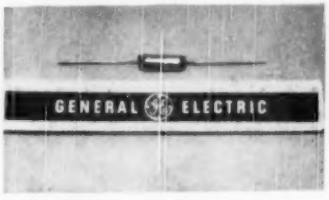
Launchings are photographed by high speed cameras to give a complete record of the plane's behavior at every stage of takeoff. Douglas says findings from these tests are helping in the development of improved catapult devices and techniques.

When to Retread

A wide variation of opinion exists among airlines relative to the length of time a tire may safely be kept in service, and the number of times it may be retread.

Most companies limit the number of retreads to two, although some allow as many as five and leave the decision whether the carcass is worth retreading up to the retreading company.

At least one airline places a 1500-hr. limit on its tire carcasses, regardless of the number of retreads.



Tantalum Capacitor

A new electrolytic capacitor, reported to be particularly suitable for electronic applications where lightweight coupled with high performance are the major considerations, has been developed by the General Electric Co., Schenectady, N. Y.

It is a 1 microfarad, 150v. d.c. Tantalytic capacitor. GE says the unit is 90 percent smaller than paper capacitors and promises to have a much longer life than aluminum electrolytic types. Development of the new condenser was made possible through use of tantalum in foil form and a new non-corrosive electrolyte.

Other advantages claimed for this hermetically sealed unit are longer shelf life, greater stability, lower leakage currents and improved low temperature characteristics.

AVIONICS

'Miniature Omnirange' Helps AA

Aircraft Radio Corp.'s portable H-14 Signal Generator permits ground check of aircraft omni equipment.

The lack of fixed omnirange stations in the New York area has posed a difficult problem to airlines in checking operation of omni equipment in their aircraft flying away from this point. But even if stations were nearby, radio interference and congested traffic make New York far from the best place to test equipment in flight.

▶ **American's Answer**—American Airlines now has found a solution to this dilemma--at least for itself. It is a "miniature omnirange" called the H-14 Signal Generator. Ten of these "preproduction" sets were developed recently by Aircraft Radio Corp., Boonton, N. J. American obtained two of them several weeks ago at a cost of $885 each.

One at LaGuardia Airport, the other at Dalls. The carrier uses the New York set to ground check omni equipment in aircraft before departure.

The test unit is currently preset for a 360-180 deg. course. As the course selector in the plane is rotated to the 360-deg. position, the "To-From" indicator moves to the "to" position and the "left-right" indicator centers. Maximum deflection of the "left-center" indicator needle is obtained at the 90 and 270 deg. positions on the course selector. As 180 degrees is approached on the selector, the "to-from" indicator moves to "from" and the "left-right" needle comes back to center.

▶ **Bench Work**—In addition to its ability to check out aircraft omni on six tracks, the unit will check the phase localizer on left-center-right and it provides a source of omni modulation for trouble-shooting on the bench. In this way, the tester is a useful aid in making minor repairs on equipment. Omni modulation also permits checks on the test set itself. The unit also permits voice transmission to the airplane.

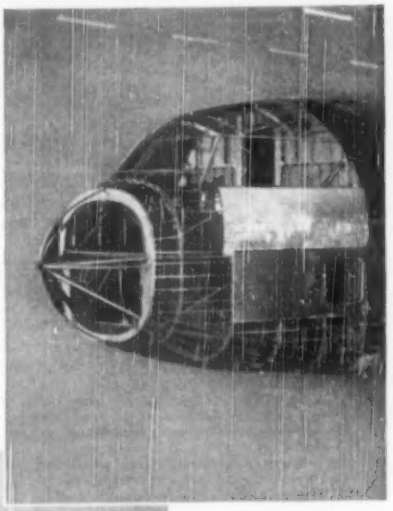
The set, as it is being used by American, gives a single course checkout of the aircraft omni as accurate as could be obtained in actual flight. And ground checks with the miniature omnirange offer advantages over flight testing. If desired, the set may be continuously adjusted to check out the aircraft omni over 360 degrees of operation at 60 degree intervals, the equivalent of testing on six different courses.

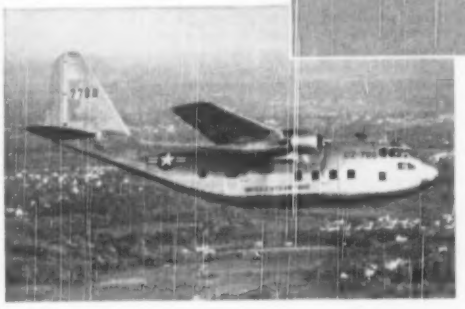
A check as thorough as this would hardly be practical in flight, since the airplane would have to fly a complete circle around the omni station to get the same results.

▶ **Single Bearing**—American now is using the "range" only for single bearing checks because a more comprehensive check is not required by the CAA. Further, switching from one course to another would require two men instead of one now employed.

American's other set, which is kept at Dallas, Tex., is used mostly for minor overhaul work. With this arrangement, omni equipment requiring small repairs does not have to be shipped all the way across the U. S. Parts requiring major overhaul, however, are sent to AA's radio overhaul shop in New York. This shop is equipped with a Collin's radio tester, designed for major overhaul work.

Built to Take it on the Nose





● The new Chase Aircraft XC-123 military transport employing a life guard of steel tubing to protect personnel in case of nose over or other accident.

A typical example of how steel tubing can be used for strength—dependability and safety.

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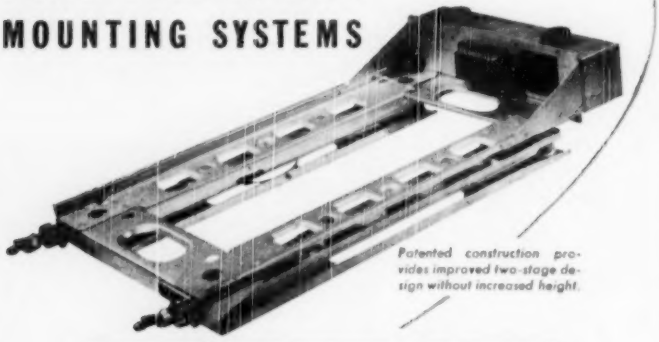

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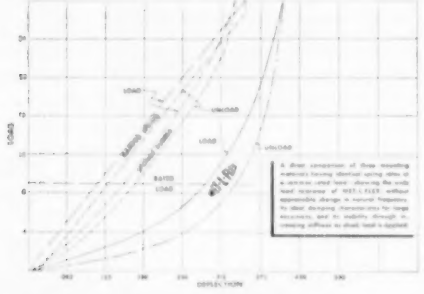

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FINANCIAL

PAA's Picture

CAB mail pay awards and carrier's estimates for 1949 seem far apart.

Pan American World Airways' final earnings picture remains blurred by pending mail rate determinations. This is highlighted in the company's 1949 annual report which estimates net income of $2,488,943 for the year, as against $4,590,726 for 1948.

Permanent mail rates have yet to be established by the Civil Aeronautics Board for all or part of Pan American's routes for periods as far back as 1945. Until final mail rates are established, a true picture is not presented of past as well as current operations.

▶ **Temporary Basis**—Mail compensation for virtually all major domestic carriers and all U. S.-flag international airlines is, and has been in recent years, on the basis of temporary rates.

With the exception of Pan American, all of these carriers have taken into current accounts only those mail revenues authorized by existing rate orders, temporary or permanent. Retroactive adjustments made in subsequent CAB proceedings have been handled three ways:

- **Credited to current** income with a notation that part of such revenue belonged to a prior period;
- **Credited the non-current** portion of such mail increment directly to surplus;
- **Re-stated past earnings** to show the proper distribution of mail revenues, where possible.

▶ **PAA's Way**—Pan American, on the other hand, has followed a distinctly different policy for the past five years. In its current revenue accounts, it includes mail pay actually authorized by existing temporary and permanent rate orders plus an estimated amount which it feels entitled to under its construction of the Civil Aeronautics Act.

Against such anticipated income, not yet sanctioned by any CAB authorization, Pan American created special reserves. Such estimates, cushioned by these reserves, have proved to be reasonably conservative in the light of rate case settlements. This has been true, for the most part, up to Dec. 31, 1948, although even then there remained unsettled a number of proceedings which may ultimately test the adequacy of the special reserves.

For example, CAB entered an order, on Apr. 29, 1949, establishing $12,783,-

000 as the additional amount to be paid Pan American as a temporary rate for the operations of its Atlantic division for 1946, 1947 and 1948—$5,852,000 being attributed to 1948. This total award compared with $13,575,000 estimated by the company and previously taken into its current accounts in the manner described above.

During 1949, the company provided a reserve of $1 million against estimated 1948 mail revenues. On this premise, the company's original estimate, cushioned by its reserve of that year, provided adequate margin to cover the actual revenue subsequently authorized by the CAB.

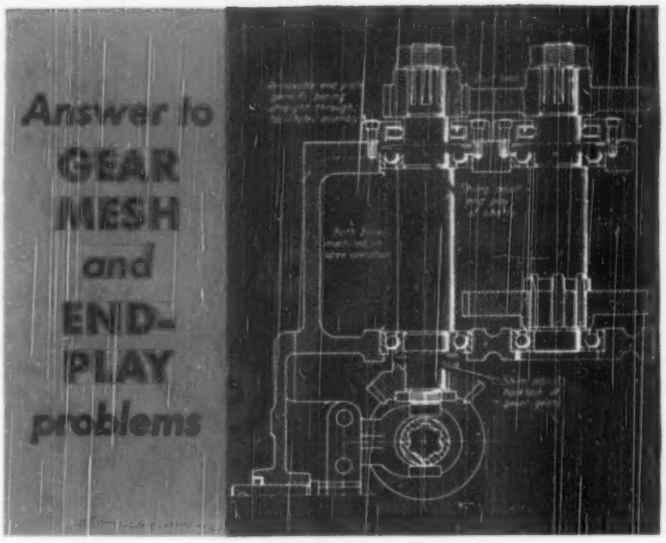
▶ **Test at Hand**—A real test, however, is now at hand. The company's estimate of 1949 mail revenue is placed in doubt by a pending mail rate action. Pan American showed $27,266,189 as mail revenues authorized by CAB temporary rates last year (as against $23,849,112 so included in 1948). In addition, the company estimated that it was entitled to another $20,966,502 against which it provided a special reserve of $7 million, leaving a net amount of $13,966,502. This compared with an estimate of $10,547,374 during 1948, less a reserve of $1 million—a net amount of $9,547,374.

▶ **New Approach**—CAB, however, issued a statement of tentative findings and conclusions on Feb. 7, 1950, proposing a new approach to rate-making, together with a revised schedule of mail payments for Pan American and the other trans-Atlantic carriers—TWA and American Overseas Airlines—for the period beginning Jan. 1, 1949.

Under this proposed rate action, Pan American would receive $9,402,213 less than the $19,097,783 estimated by the company and taken into its 1949 income (before special reserves). The company now takes the position that if this proposed Atlantic rate is imposed the 1949 profit would be eliminated. Further, if the same approach is applied to the company's other services, a large loss would result.

In still another action concerning mail rates for its Latin American services from Jan. 1, 1949, Pan American's estimated income from this source is also being challenged by a CAB order. The Board would increase temporary rates on the Latin American services for last year to $7,225,000. This would compare with the $13,755,000 estimated by Pan American.

▶ **TWA and AOA**—In the trans-Atlantic mail rate proceeding, TWA and American Overseas Airlines are similarly involved with Pan American. All three are protesting the Board's proposals. However, AOA, in its 1949 report, does not include in its current accounts any anticipated income based on mail rates not authorized by a temporary or perma-



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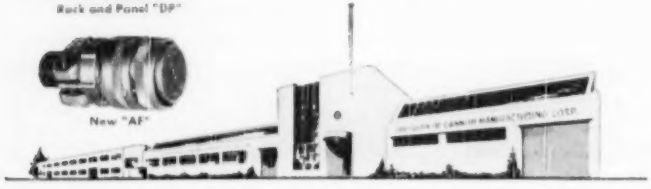


nent order. For this reason, that carrier showed a loss of $348,477 for last year. By the same token, TWA's international routes would have shown a greater return than they did if such anticipated income were included.

A very important factor in Pan American's outlook is the proposed acquisition of AOA, now awaiting final determination by CAB and the President. This acquisition, if approved, will of course strengthen the company's position in the trans-Atlantic services. Pan American attributes its trans-Atlantic traffic decline from 30.5 percent in 1947 to 25.5 percent in 1949 to the expansion of services of state-owned foreign-flag airlines.

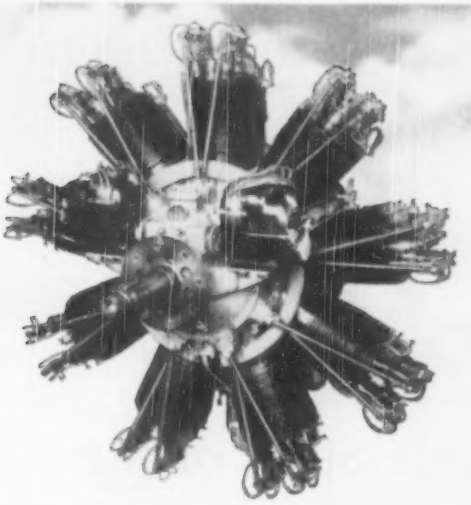
▶ **Stratocruiser Factor**—The initial high operating costs of the Stratocruisers receive special mention in the report. It was unquestionably a factor in the higher expenses experienced last year. The necessity of taking individual units out of service from time to time for modification and test contributed to low utilization. The company passed along to Boeing, Civil Aeronautics Administration and other users of this type aircraft the benefits of improvements it effected.

Pan American has adequate financial accommodations to handle its immediate requirements. On Sept. 20, 1949, a new $59-million four-year stand-by credit agreement was arranged with a group of 30 banks in 13 cities. This arrangement replaces previous loan accommodations. The current credit provides an interest rate of 3 percent, reflecting rising interest rates. The agreement of October, 1946, providing the company with funds of $40 million, carried an interest rate of only 1¼ percent.

▶ **Reserved for AOA**—The current loan was drawn on to the extent of $40 million by Dec. 31, 1949. The additional available credit of $19 million is related to the proposed acquisition of AOA. Of this amount, $10 million was drawn down on Mar. 31, 1950, with the proceeds invested in U. S. government bonds. The remaining $9 million may be borrowed only if the AOA acquisition is consummated on or before Sept. 30, 1950. If the AOA deal is not approved, the $19 million is repayable immediately.

As of Dec. 31, 1949, Pan American showed net working capital of more than $20 million as against $11.7 million a year earlier. However, at the most recent year-end, there was outstanding a long-term debt of $35 million compared to only $25 million at the close of 1948. Also, included in current liabilities at the 1948 year-end were notes payable of $10 million. This amount was but $5 million in 1949.

—Selig Altschul

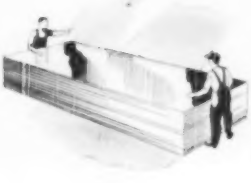


1921

Alcoa Aluminum was right for America's first radials

Aviation progress leaped ahead when the Lawrance 9-cylinder radial engine passed its Navy acceptance test early in 1921. For the first time, America had a fully successful, air-cooled engine of more than 100 hp. With few basic changes, the Lawrance engine was developed into the famous Wright "Whirlwind"—destined to power a long series of record-breaking flights. In all these first radials, Alcoa Aluminum's light weight and rapid heat conductivity made it the choice for cylinder heads, pistons and crankcases.

1950



Alcoa pioneers again with *larger* Aluminum Plate

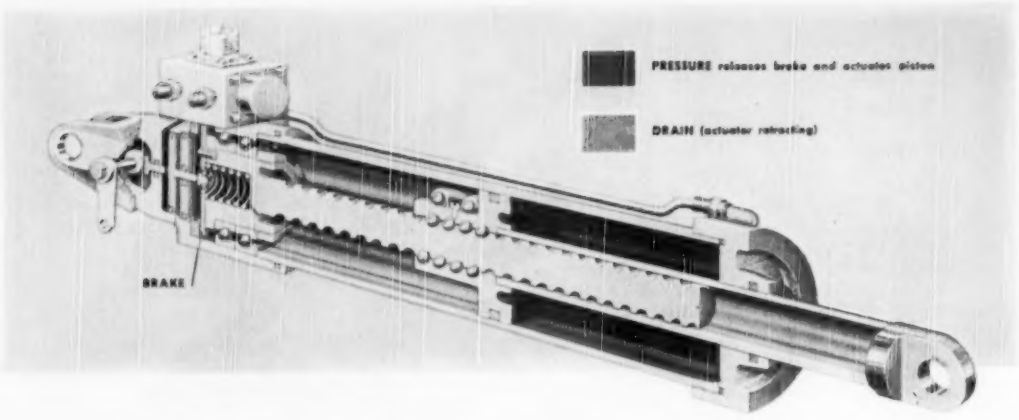
Air frame fabrication has come a long way since aluminum became the leading flight material. New shop methods. New design tricks. New forms of aluminum, too. For instance, Alcoa recently made available aircraft plate in greater widths up to 120", longer lengths up to 39' and a weight per piece up to 4,000 pounds—opening the way to lower costs, higher performance.

Whatever your requirements, look to Alcoa as your "Flight-metal Headquarters". ALUMINUM COMPANY OF AMERICA, 1800E Gulf Building, Pittsburgh 19, Pennsylvania.

Send for your free copy of "How to Use High-strength Aluminum Alloy", a convenient engineering reference to guide your use of 75S.

ALCOA

ALCOA ALUMINUM and MAGNESIUM



Inside Story of the Aeroproducts Locking Hydraulic Actuator!

CHECK THIS AEROPRODUCTS ACTUATOR design for your most critical positioning needs—such as stabilizer control, sweep back and wing incidence. It offers these unique advanced Aeroproducts operational and safety features.

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- Easily synchronized for two or more units.
- Can be remotely controlled by a Solenoid Valve.
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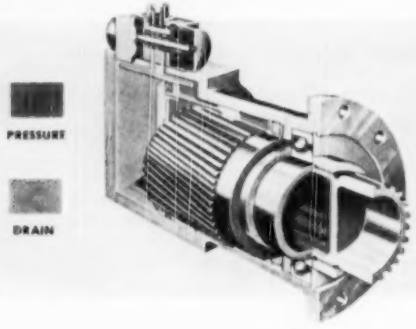
This design is satisfactory for operation at 3000 psi; stroke rate and thrust are limited only by available flow and pressure. Like all Aeroproducts actuators, it can be produced in sizes and modifications to fit your needs. Your inquiry will receive prompt attention.



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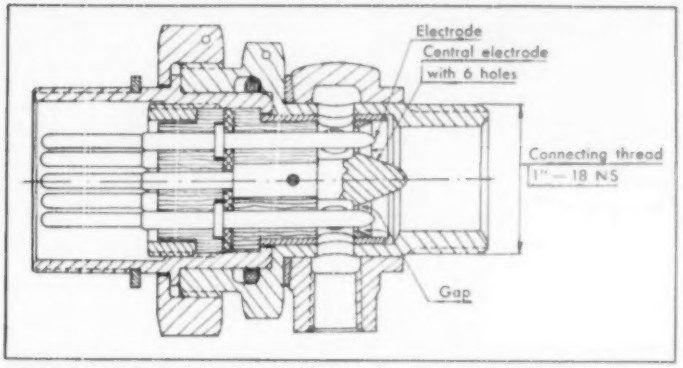
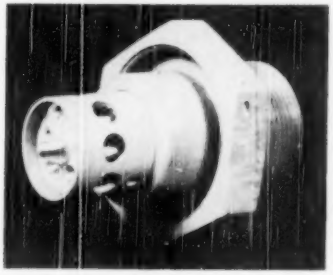
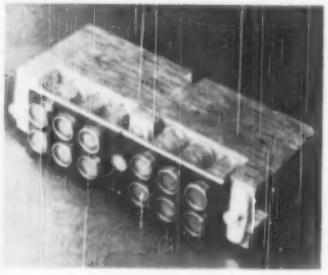


SECTIONAL VIEW of SAAB's new device for spotting engine failures and . . .



DETECTOR ready to be put in engine.



PANEL holds cockpit warning lights.

Device Warns of Engine Failure

SAAB's improved magnetic sump plug gives early warning of breakdown; bank of lights indicates seriousness.

The principle of the magnetic sump plug as an engine failure indicator has been developed by Svenska Aeroplan AB of Sweden in a new device that can detect an incipient engine breakdown in flight as soon as disintegration commences.

The device consists of a sump plug, mounting a silver center electrode with six holes grouped symmetrically around the periphery. Six separate electrodes partly obstruct these holes so that oil may pass through freely, but any metal particles in the oil would be caught, close the circuit between the two electrodes and illuminate a warning light in the cockpit.

►**Chip Detector**—A basically similar device, called a "chip detector," has been used by at least one U. S. engine manufacturer for the last ten years. Its application, however has been exclusively for test work—at first on new or rebuilt engines while being run-in on the bench, and later in flight test engines.

T. Grey of Curtiss-Wright stated that the chip detector has not been installed in engines sold to the airlines because fine chips, whose presence was not necessarily indicative of engine failure, would tend to accumulate in the unit, causing it to give an alarm and thus creating a definite psychological hazard for the pilot.

A new version of the chip detector is undergoing service test. The unit presumably will eliminate any false alarms. It incorporates a type of sediment chamber which will collect fine, insignificant metal particles and will register an alarm only when pieces of sufficient magnitude to indicate engine failure pass through it.

►**Swedish Way**—The Swedish unit incorporates six warning lights for each engine, mounted on the instrument panel. The pilot can judge by the number of lamps lit and the rapidity of their lighting sequence just how serious a failure is. This will make it easier for him to decide on proper corrective action.

The detector housing is ruggedly built and is designed to replace current sump plugs. On the present model a 1-in. 18NS thread is used, fitting Scandia's Pratt & Whitney R-2180-E-12 engines.

The electrical connectors have been designed to permit rapid connection or disconnection, to expedite trouble-shooting.

The plug was designed as simply as possible to preclude generating malfunctions within the unit itself and resultant false alarms. Absence of moving parts should contribute materially towards this end. To avoid electrolysis through the oil, alternating current is supplied to the electrodes.

The primary advantage of this type of detector is its apparent ability, despite low cost and design simplicity, to detect an engine failure at inception, allowing the pilot sufficient time to shut down the engine before major damage occurs.

Regulated Power

PSR-100 electronically regulated power supply unit, marketed by **American Electroneering Co.**, 2112 South La Brea Ave., Los Angeles 16, Calif., is designed for use by research and development laboratories working with aircraft radio, radar, sound equipment, guided missiles and allied activities.

Power regulation with this unit is claimed by company to be "twice as good as that available in any competitive power supply." Regulation is ½ of 1 percent for any output voltage from 30 to 500 v. d.c. under any load conditions from 0 to 300 milliamperes, and any line voltage variations from 105 to 125 v. a.c.

Maker states fully tropicalized iron core components in unit are of sufficient size and rating to insure good regulation, minimum ambient temperature rise (30 degrees), minimum ripple, and long continuous-duty life.

Oil condensers are used throughout except where high capacity requirements prohibit their use because of size limitations. Where electrolytic capacitors are used they are de-rated to provide maximum life, maker says. All resistors also are de-rated.

Panel type unit with enclosed cabinet is designed to mount vertically on standard relay rack, or to be used on bench. Front panel measures 19 x 12¼ x 3.16 in. Dimensions of unit excluding panel are 17¼ x 16 x 12 in. Device weighs about 145 lb.

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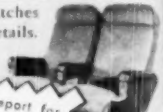

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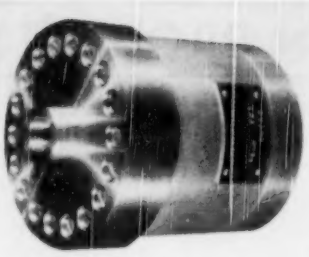
Bridgeport Woven Fabrics Est. 1837



Pressure Transmitter

Teledyne electric pressure transmitter, "developed to meet . . . demand for high pressure transducers in connection with guided missile and rocket application specifically in the aeronautical industry," is offered by **Frederick Flader, Inc.**, N. Tonawanda, N. Y.

Unit is designed for use with corrosive mediums such as red fuming nitric acid. It incorporates four active 300-ohm bonded strain gages arranged in a Wheatstone bridge circuit and is available in ranges from 100 to 5000 psi. Powered by maximum of 18v., instrument produces full scale output of 50 millivolts open circuit. Output is linear with pressure and its repeatability is better than ¼ percent of full scale.

Device is fully temperature compensated for zero shift and sensitivity changes with temperature. Zero shift will not exceed .01 percent of full scale per degree F. change. Undamped natural frequency of transmitter is over 1500 cps., depending on range.

Unit has 3¼-in. height and 3¼-in. diameter. Weight is about 30 oz. It is manufactured under Baldwin Locomotive Works license.

Navigation Aid

Lightplane navigation instrument, made by **Grimes Mfg. Co.**, Urbana, Ohio, automatically converts time to distance. Pilot simply sets estimated ground speed into instrument and starts its built-in timer which starts recording pilot's mileage.

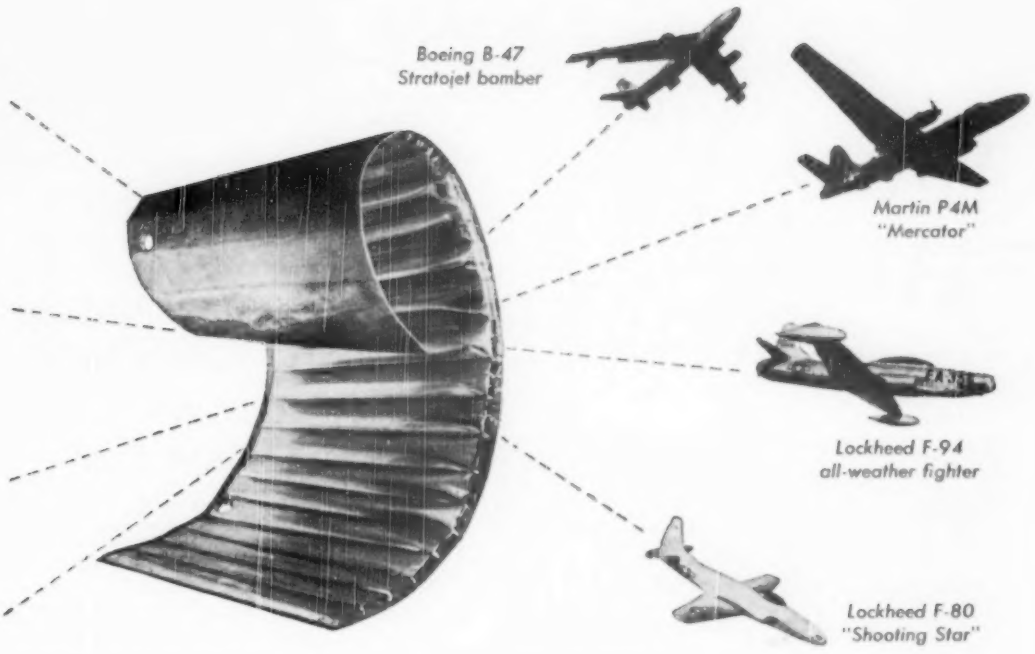
Called the "Navigator," instrument is used in conjunction with Grimes navigation tape. Pilot may read direct from instrument face the number of miles he has flown. He then refers to chart and the navigation tape marking his course. This transparent tape also is marked off in miles and is designed to show his position at a glance. Ground speed can be determined and readily corrected after one or two check points. Instrument adjusts for speeds ranging from 65 to 240 mph. and navigation tape is available for both Sectional and World Charts.

Grimes engineers say new instrument is particularly valuable when flying over unfamiliar landmarks or when minimum visibility prevails. Unit can be mounted on instrument panel, but does not have to be connected into aircraft systems in any way.

Temperature Senser

Resistance-wire, temperature sensing element, offered by **Barber-Colman Co.**, Rockford, Ill., is designed for use in high velocity aircraft ventilating ducts. The unit combines several wire elements, all enclosed to give maximum protection with minimum sacrifice of sensitive response.

Enclosure is pressure tight and fitted with standard AN connectors. Maker says increased temperature response, approaching that of bare wire elements, is obtained through spring contact between element and enclosure which are separated by mica insulator. Standard units have circular mounting flange, but special mounting details can be supplied by the manufacturer.



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Shown above are four current model jet-powered planes that use Thermoflex Insulation Blankets as standard equipment.

Thermoflex Blankets were selected for use in these first-line service planes because they have the essential lightweight, space and thermal characteristics for fulfilling every insulation requirement of modern jet design.

These flexible blankets owe their insulating efficiency to a Thermoflex felt completely sealed within corrosion-resistant Inconel or stainless steel metal foils. At 800 F. mean temperature the conductivity of the felt (4 lb. per cu. ft. density) is only 0.76*. Yet the complete blanket weighs as little as 0.30 pounds per square foot and up.

Improved fabrication techniques assure accurately spaced cutouts for fuel lines, thermocouple leads, etc., which may be hung directly on the blanket surface. A special grooving facilitates installation and insures perfect fitting around cylindrical and conical surfaces. This blanket does not "puff up" when heat is applied.

Thermoflex Blankets are custom-made for use on exhaust cones, tail pipes, turbine casings and afterburner assemblies of turboprop, turbojet and auxiliary power units. They are also available for de-icing and cabin air heating units.

Send for this booklet: It's full of useful information about Thermoflex Blankets and other Johns-Manville products for the aviation industry. Just use the coupon below.

*Btu in. per hr. per sq. ft. per degree F

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SALES & SERVICE

Air Taxi Network Plans Go Ahead

Membership in group is now 32 local operators; 100 expected by July 1, scheduled opening date

The proposed national network of air taxi operators, to provide integrated special plane service between major terminals and off-airline airports in smaller cities, is scheduled for operation July 1.

Plans are now being completed by the Air Taxi Conference and the Air Traffic Conference of America. About 100 operators will be enrolled in the system by the summer's end, with 32 already in, according to Joseph Garside, head of Wiggins Airways, Norwood, Mass., who is president of the Air Taxi Conference. Operators are still needed in California, Texas, and the Rocky Mt. states.

▶ **Airlines Approve**—Airline approval for the system was given in general terms at a recent Air Traffic Conference meeting at Miami. Next step is signature of interline agreements between the airlines and the operators. It is expected that the conference may be given blanket power to act for all the airlines in the agreements.

▶ **Network Plans**—Among the taxi network's plans:

• **A bonding company** to bond every participating operator for $1000 to the airlines, to insure his proper handling of airline ticket funds.

• **Operators will make** airline reservations from their off-airline home towns to the nearest major airline terminal city by collect telephone calls.

• **The operators will accept** collect telephone calls from the airlines in nearby cities for air taxi reservations.

• **Standard air taxi rates** are expected to be established. Analysis of rates proposed by the operator members already signed shows average around 10-12 cents/mile for a two-place air taxi flight and 15-18 cents/mile for a four-place taxi.

• **Examination of operators** by the bonding company to verify that they are meeting the proposed requirements as to equipment, pilots, responsibility, etc.

• **A $10 exchange order** will be sold by the airline to airline patrons desiring to order air taxi reservations. It will be redeemable in air taxi fare, but not subject to refund unless the flight is cancelled by weather or inability of the operator to perform. This arrangement has been planned to protect the air taxi operators against "no show" patrons.

• **Personal Aircraft Council** of Aircraft Industries Assn. has agreed to provide 50,000 pamphlets advertising the taxi service, for distribution to patrons by the airlines.

• **"Flying Kangaroo"** insignia, "For Short Hops," is being designed for promotional advertising, and to be displayed on air taxi planes.

First listing of the air taxi operators who have already affiliated with the conference and indicated their intention of beginning operations July 1 will be shown in the next issue of Airline Guide, soon to be off the press.

Plans for a paid executive director of the organization are still tentative and will depend largely on the additional enrollment of operators into the Air Taxi Conference.

SUPER NAVION IN FLIGHT

First flight photo of Ryan's new Navion Super 260 executive plane, powered with a Lycoming GO-435-C2 engine developing 260 hp. for takeoff, shows the additional length of the nose, resulting from the bigger powerplant. Plane is priced at $13,995 flyaway San Diego. Performance quoted includes 170-mph. cruising speed, 1250 ft./min. rate of climb, 400-ft. takeoff run, and 900-mi. absolute cruising range at economy cruise settings. All figures are at 2850-lb. full gross weight in zero wind condition. Super Navion is first plane certificated with the new geared Lycoming engine which turns 3400 engine rpm. for takeoff, with the propeller turning only 2180 rpm. Les Bowman, Texas Navion distributor, reported averaging 192 mph. in a nonstop San Diego to El Paso flight using 12.7 gal. fuel with one of the new 270s.

BRIEFING FOR DEALERS AND DISTRIBUTORS

▶ **WINDSHIELD WIPERS NOTE**—Operators are advised by Flight Safety Foundation to caution their linemen against cleaning plane windshields during or immediately after refueling. Recent tests revealed that static electricity was generated while cleaning certain types of plastic windshields.

▶ **FLYING AMBULANCES**—At least 600 aircraft are being used as ambulances, according to a CAA survey being prepared for release soon. Included will be a complete listing of the planes and their size, speed, facilities, etc. CAA plans to make this listing available to doctors and hospitals.

▶ **BUSINESS PLANE UPTREND**—Shell Oil Co.'s Hugh Harvey notes that business use of private planes has climbed four-fold in the last three years, with some 32,000 craft being utilized. Last year they flew a half million more hours than all commercial planes. About 8000 are being used by corporations, and about 4900 are owned by farmers for dusting, spraying, fertilizing, and seeding.

▶ **FLOTTORP-BEECH-ROBY DEAL**—Beech Aircraft has granted Flottorp Manufacturing Co. exclusive rights to make, sell, and service the R002 and R003 series Beech-Roby controllable-pitch props for small planes. Flottorp is incorporating its Armor Coated blade into the Beech prop. The Grand Rapids, Mich., propmaker has already set up a factory service plan to cover the new addition to its line.

▶ **CAA EXAMINER REPS**—In order to provide better service to the industry, CAA has revised its designated pilot examiner program, whereby designees represent the government agents in giving flight tests to aspiring pilots. Designations will heretofore be in force for one year only; only one certificate of authority will be issued to each designee, and the pocket-size certificate will list on the back the CAA district office under which the designee operates. Under the new system CAA will be able to maintain more accurate records on the designees and keep them posted more frequently on their duties.

Pilot Employment and Wages

(16 Domestic Trunklines)

Carrier	1949 No. Pilots	1949 Avg. Salary	1948 No. Pilots	1948 Avg. Salary	1947 No. Pilots	1947 Avg. Salary	1946 No. Pilots	1946 Avg. Salary
American	726	$9279	723	$9054	785	$8149	1177	$5928
Braniff	172	7879	168	7981	162	7899	208	5670
Capital	304	8316	303	7570	237	7783	348	5508
Chi. & So.	115	6979	116	7184	119	6866	146	5580
Colonial	64	7503	58	6916	47	6493	56	5952
Continental	82	7571	97	6481	88	6248	83	5316
Delta	224	7164	203	7088	203	7077	208	5538
Eastern	732	8040	708	8892	715	7430	755	5952
Inland	45	7455	38	7341	37	6832	33	5520
Mid-Cont.	129	6401	110	6400	99	6210	90	5640
National	172	7771	164	5369	100	7486	160	5856
Northeast	80	7163	69	6667	66	6861	86	5766
Northwest	331	8989	248	8477	228	9365	339	6396
TWA	718	8183	858	7293	819	7143	791	4266
United	759	8697	930	7415	941	6260	996	6528
Western	109	8501	95	8016	97	7490	138	5676
	4762	$8280*	4888	$7795*	4743	$7356*	5614	$5694*

Figures for 1949, 1948 and 1947 are for fourth quarter of each year. 1946 figure is for December only.
* Averages are approximate. (Pilots and co-pilots included in compilation.)

ALPA-Airline Talks Near Climax

Faster, more productive transports endanger job security, pilots feel; management worried over 'featherbedding.'

By Charles Adams

A showdown is approaching in the long-winded, hard-fisted bargaining negotiations between the Air Line Pilots Assn. and airline management.

- **ALPA** fears spread of technological unemployment among its members.
- **Airline management** is equally disturbed by the specter of "featherbedding."

Larger, faster and far more productive transport planes are limiting the demand for cockpit personnel despite the upswing in airline traffic. As a result, ALPA this year is making its biggest pitch on the issue of job security, although it demands higher wages also.

▶ **Fewer Pilots**—Number of pilots and co-pilots on the 16 domestic trunklines fell from 5614 at the end of 1946 to 4762 during fourth-quarter 1949. During the same period, revenue ton miles flown by the carriers increased more than 23 percent.

(It should be noted that the 1946 pilot total represents an artificial peak. Many pilots then on company rolls were in training and had been hired in anticipation of increased traffic which failed to develop.)

With the domestic trunklines showing more than $24 million operating profit last year and getting off to a good start in 1950, ALPA figures the industry can well afford to spread the pilots' work to provide more employment at higher rates.

Management, on the other hand, says that last year's earnings did little more than balance the heavy deficits incurred in 1946 and 1947. Airline officials contend that the real "forgotten men" of the industry are not the pilots, whose wages have gone up steadily in recent years, but the stockholders, who, with few exceptions, haven't received any dividends on their investments since 1946.

▶ **Contracts Open**—ALPA employment agreements with about 15 airlines are now open for revision. But the pact with American Airlines, reopened last July, is regarded as the key agreement around which a new industry pattern may be set.

After months of union-management jockeying, the National Mediation Board was called into the AA-ALPA bargaining negotiations last December. With no agreement in sight, ALPA now regards the situation as "tense," although no strike threat has been made public.

As in the industry generally, American now has fewer pilots and co-pilots than it had several years ago. But despite the reduction in numbers from 1177 in December, 1946, to 726 in fourth-quarter 1949, pilot salaries represented about 16 percent of the carrier's payroll and around 7 percent of its total operating expense during both periods.

In December, 1946, pilots and co-pilots composed more than 8 percent of American's total personnel. By the end of last year, the proportion was less than 6.8 percent.

▶ **Top Wages Paid**—By tackling American for a contract which may set an industry pattern, ALPA is taking on not only the largest domestic carrier, but also the line paying the highest average salary to pilots and co-pilots. AA's average annual pilot-co-pilot wage as of fourth-quarter 1949 was $9279, compared with $9054 in 1948, $8149 in 1947, and $5928 in December, 1946.

As ALPA sees it, when Convair-Liners replace DC-3s (as they have on

American), productivity is tripled because of the newer planes' higher speed and greater payload capacity. A DC-6 or Constellation produces at least five times as many ton-miles per hour as a DC-3; but, the union argues, the number of pilots required remains the same.

David L. Behncke, ALPA president, emphasizes that maintenance of a sufficient pool of competent and experienced airline pilots is of prime importance to national defense and one of the main justifications for airline subsidies. "You can't mothball pilots like you can planes, ships or guns," Behncke points out. Thus, he contends, the decline in pilot employment may prove a major calamity.

► **Mileage Limitation**—While both sides are close-mouthed on details of their negotiations, it is known that the major issue of the American-ALPA discussions is the union's demand for limitations on the number of miles pilots can fly each month. Maximums would vary according to equipment used. But in any case, cockpit personnel would probably reach their monthly mileage limitation considerably before they had accumulated their maximum 85 hr. of flying time—possibly at 65 hr.

ALPA has wanted a limit on monthly mileage ever since the National Labor Board set up the pilots' basic pay structure in 1934. The union feels a monthly mileage restriction is a "must", now that jet transports are in the offing. ALPA thinks the 85-hr. flight time limit should be cut to 75 hr. or less.

► **On-Duty Restriction**—Pilots also want an "on-duty" time limit and adequate pay for work on the ground. They complain that they spend the best and most unremunerative years of their lives filling out reports, getting weather information or just waiting before flights.

Management contends that pilots' base pay (which captains receive in addition to hourly pay and mileage pay) compensates them for on-duty ground time.

(Airline captains are now paid according to a formula which takes post-war planes' higher weight and speed into consideration. Thus American's hourly pay scale for first pilots is divided into three brackets: Planes certificated for maximum gross weights through 50,000 lb.; from 50,000 through 100,000 lb.; and 100,000 through 150,000 lb. Each of the brackets is further sub-

Baltimore's Bargain Airport

Baltimore's new 3200-acre, bargain-counter Friendship International Airport (above) is being spruced up for early opening. At a cost of only $15 million (the federal government furnished $5 million), Baltimore has a field which it claims is five times larger than Washington National and four times bigger than LaGuardia.

Friendship's cost—reasonable for a big airport (New York International, 4800 acres, already has cost upwards of $100 million)—is due to its site. No fill was required and large earth-moving machinery could be used.

An extensive zoning law was enacted to keep the airport's approach clear. Construction is regulated within a 32-sq. mi. area. No structure or power lines higher than 280 ft. above sea level can be built within four miles of the runways. As a result, Friendship has the unusual glide ratio of 50-to-1.

Instrument runway (center) is 9450 ft. long and 200 ft. wide. Two other runways are finished, and three more can be built. The nine-story administration building is 110 ft. high. Floor space in the main and service buildings totals 173,000 sq. ft. For stop-over passengers there are 22 roomettes with showers, dressing tables and beds. There is a dining room and cocktail bar. Limousine time from the field is: 35 min. to Washington; 15 min. to Baltimore; and 25 min. to Annapolis.

HERE IS A NEW ANGLE TO LOOK AT . . .

Eight 6-ship Mul-T Buildings from International Steel bring revenue to the Miami Valley Flying Service at South Dayton Airport, Dayton, Ohio.

Since door openings are of the greatest importance in a hangar building, International engineers design doors to meet specific hangar requirements. For example, notice the exclusive Bi-fold Canopy door used on the International Mul-T hangar. Here, International eliminates all sticking, freezing, and wind or ice failure common to lightweight sliding doors. This same sound engineering thinking is carried through in the design of doors for large shop hangars.

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divided into seven to nine speed categories, with both day and night pay increasing as scheduled block-to-block speed rises.)

▶**Other Demands**—The pilots want increases in current base, hourly and mileage pay so that even with mileage limitations they would have increased take-home wages. They also seek deadheading and layover pay, more liberal vacations and sick leave, and higher allowances for meals, etc., away from the home base.

Co-pilots present a special problem. ALPA believes they should not only receive higher base pay but also mileage and hourly pay like the captains.

Sore point with ALPA is the slowup in promotions for co-pilots until the post is practically a permanent job. The union says many captains have been demoted to co-pilot status, while co-pilots at the bottom of the seniority list have been laid off.

Former first pilots must again revert to captain's status before any of the regular co-pilots have a chance for promotion to captaincy. With some airlines having co-pilots of up to ten years' standing, ALPA feels higher pay is necessary to compensate for the limited chances of advancement.

▶**Retirement Issue**—Pensions, a major bargaining issue in other industries this year, have not figured importantly in ALPA demands. The union's membership reportedly is divided over the need for new retirement programs, many pilots having investments in annuities.

ALPA, which has a minimum monthly wage guarantee for captains in its agreement with United Air Lines, wants a similar setup in contracts with American and other carriers. The United pact also has a provision whereby first-pilots receive a $100 increase in the flying-pay portion of their monthly guarantee when they fly new-type equipment which has been used by UAL less than a year.

One reported ALPA objective which might seriously affect the feederlines is a demand for additional pay for landings made in excess of a set maximum per month. Pilots feel that because landings and takeoffs are the most dangerous portions of any flight, extra compensation should be given where there is a disproportionate large number.

Feeder Seeks Lower Pilot Pay Scale

The Air Line Pilots Assn., which is after big game in its current contract talks with American Airlines and other trunk operators, thinks it is being nipped in the heels by the industry's smaller fry.

Mid-West Airlines, a certificated feeder using light planes, has asked the Civil Aeronautics Board for a special exemption to pay its pilots less than the current legal minimum wage. The move troubles ALPA because it feels, if such requests are granted, they would have a far-reaching effect on all current airline-union contracts and those which may be negotiated in the future.

▶**Special Scale Proposed**—Specifically, MWA wants to pay the 14 pilot-captains of its single-engine Cessna 190s a minimum of $300 during the first three months of service; $350 for the next three months, and $375 thereafter. This would cover the first 70 hr. of flight time per month, with additional hours (up to the 85-hr. limit) to be paid for at the rate of 1/70 of the minimum monthly rate.

MWA President F. C. Anderson thinks payment of the regular scale would obstruct his company's development and possibly prevent it from continuing operations. He says the lower rate would not affect safety.

Mid-West's four-passenger Cessnas operate only during daylight hours over flat terrain, which, the company feels, presents no operational problems for flight personnel. The carrier thinks it is illogical that the Cessna, with its 240-hp. engine and 107-mph. block-to-block speed, should require the same pilot

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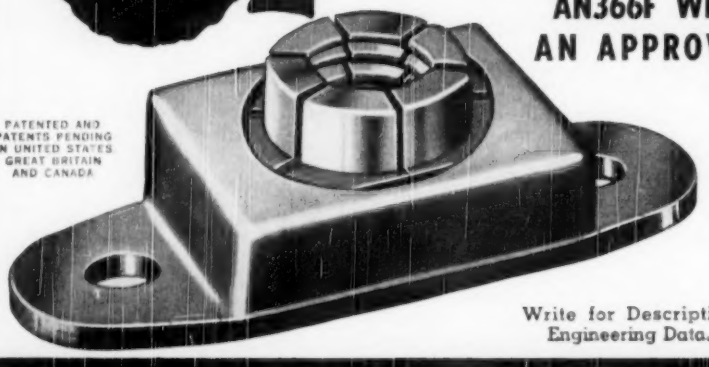

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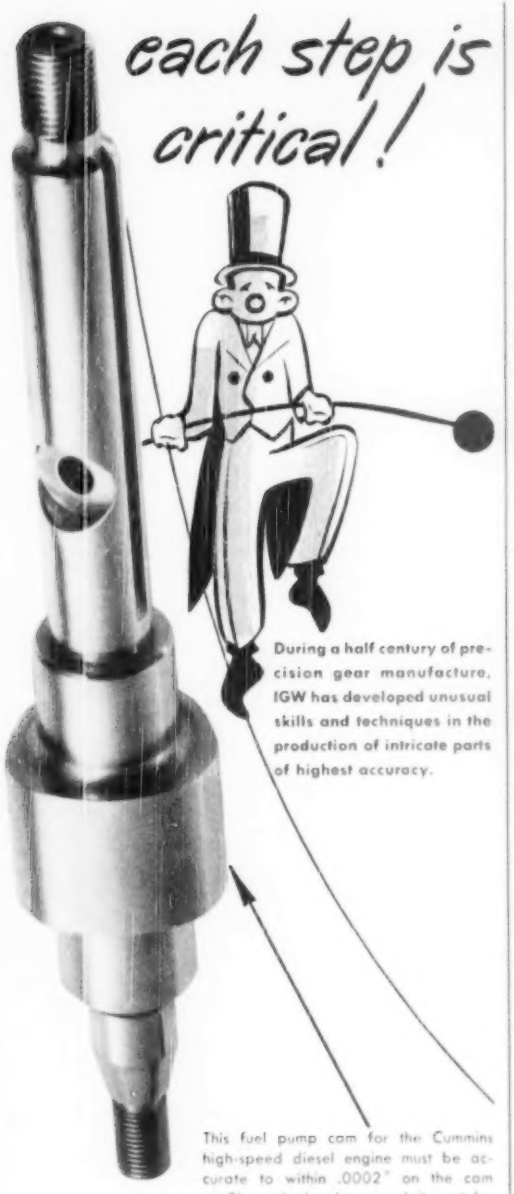

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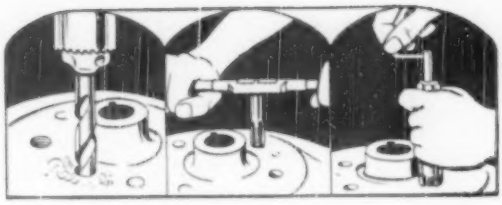

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pay scale as a 21-passenger DC-3.

► **Subsidy Problem**—Average monthly mileage flown by MWA pilots is 8100—substantially less than the total flown by pilots of other feeders and trunklines which operate aircraft of greater speed and capacity beyond the daylight hours. Anderson says that if Mid-West must pay the same pilot wage required of other carriers by the Civil Aeronautics Act, then the cost will have to be passed on to the government in the form of increased mail subsidies.

Mid-West didn't start scheduled service until last Oct. 21. But the company's pilots during the last quarter of 1949 were paid a rate equivalent to $7237 annually.

This $7237 was considerably more than the average of about $6000 annually paid by such feeders as All American, Monarch, Piedmont, Robinson and West Coast to pilots and co-pilots of their DC-3s. It is also above the average pilot-co-pilot wage of several trunklines, including Chicago & Southern, Delta, Mid-Continent and Northeast.

► **ALPA View**—A request similar to Mid-West's was made to CAB last summer by an applicant for lightplane routes in Texas. No decision has been reached on the case, and ALPA is fighting the application. The union says it "seriously questions the advisability of entrusting the lives and property of the public to airline pilots whose abilities command no more compensation than the $275 to $300 monthly (envisioned by the Texas carrier)."

ALPA has always opposed single-engine airline operations as a matter of principle. The union is using its influence to prevent any more such certifications. Further, ALPA is fighting present CAB proposals to transfer points now on trunkline routes to those of the feeders.

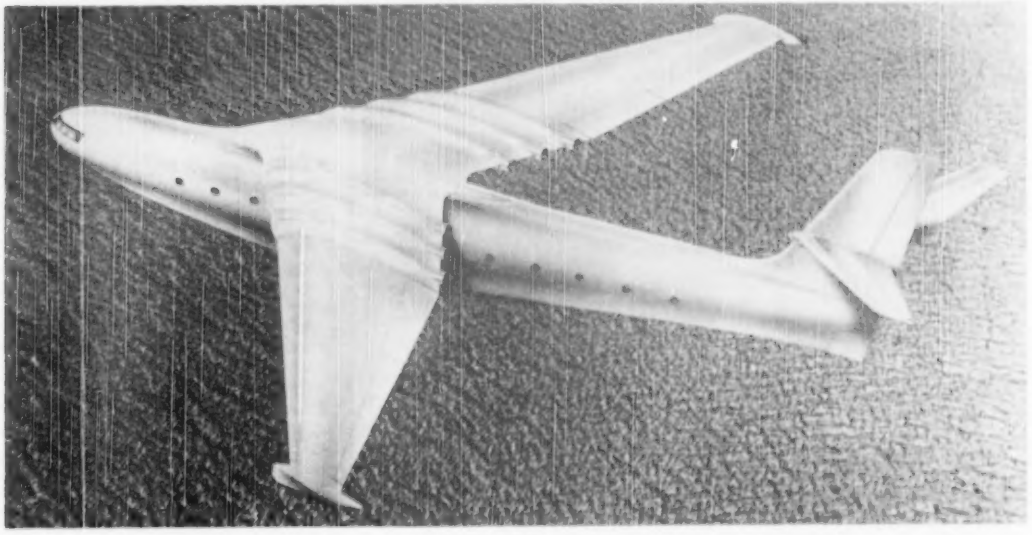
At least one other feeder using lightplanes reportedly feels that minimum rates now specified in the Civil Aeronautics Act are out of proportion to the duties and responsibilities of pilots flying lightplanes. But another carrier in the same category believes strongly that the amount saved would not counterbalance the effect of the wage reduction on the pilots' morale.

Havana ICAO Meet

Nearly 200 delegates to the second Caribbean regional air navigation meeting of the International Civil Aviation Organization have completed a three-week session in Havana. Represented were 27 member states, 5 non-member states, and 7 international organizations. Elected president of the conference was Mario Torres Menier, one of Cuba's oldest pilots and head of that country's delegation.

Major topics discussed in detail included new airports to be built in the Caribbean area, airways to be organized, communications to be employed, methods of controlling air traffic in the area, organization of meteorological and other services, and the extent of contributions to be made by member states.

A plan was drafted for distribution of air navigation frequencies in the Caribbean, South American and Atlantic regions. Basis would be the so-called plan adopted at the International Radio Communications Conference, October, 1949.



Saunders-Roe Plans Duchess Turbojet Flying Boat

(McGraw-Hill World News)

London—Britain is seeking to extend its commercial jet lead in still another direction—the turbojet flying boat. A design study of such a craft, having six 5000-lb.-thrust de Havilland Ghost jets, has been carried out by Saunders-Roe, Ltd., of Cowes, Isle of Wight, and the company is reported to be discussing the projected 74 seat giant with Tasman Empire Airways for use on the airline's Australia-New Zealand run. Tasman now uses Short Solent boats on this route.

► **Characteristics**—The Saunders-Roe Duchess is designed to cruise at 500 mph. on stage lengths of about 1500 mi. Using the standard method for assessing costs developed by the Society of British Aircraft Constructors, cost per passenger-mile of the plane is estimated at just over .01 cents for stage lengths of 1300-1500 mi. Cost per ton-mile is figured out at just over 14 cents per ton-mile over the same stage length, and 21 cents for 2000 mi.

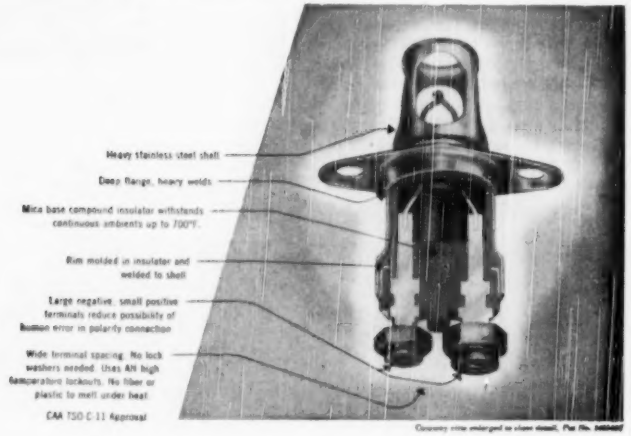
Gross weight of the plane is 130,000 lb., with wing span being 135 ft. 6 in., and length 124 ft. 6 in. Passenger accommodations will be pressurized.

Capt. E. D. Clarke, Saunders-Roe managing director is now in New Zealand talking the Duchess over with Tasman Empire Airways officials, who are interested in plane's qualifications.

SHORTLINES

► **Air Transport Assn.**—Sam Saint, director of ATA's Air Navigation and Traffic Control div., told the American Society of Mechanical Engineers that airline safety would be improved by use of: Lighted distance markers, consisting of signs with numbers large enough to read placed every 500 ft. along runways; better altimeters—designed to read like odometers, inherently self-checking, and equipped with a limit warning-switch that could be set by a pilot to attract attention if the flight path goes below a safe altitude for the area involved; angle of attack indicators with a signal to call attention to stalling danger on landing approaches.

► **All American**—Has been offered additional mail pay to relieve its critical financial condition. Newly proposed CAB rates would give the carrier 80 cents a plane-mile from Mar. 7, 1949, to Mar. 31, 1950; 60 cents from Apr. 1, 1950, to Mar. 31, 1951; and 50 cents thereafter. The Board noted that while AAA has reduced costs and cut schedules on some route segments, its operating expenses remain the highest of any feeder of comparable size using DC-3s.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► **Boeing**—Maynard Pennell, chief of preliminary design, says turbojet transports being plotted on company drawing boards—will have cruising speeds between 500 and 600 mph. for perhaps the next decade. He believes it will be at least ten years before any jet transport passes the 600-mph. mark because of the problem of preventing excessive increase in drag as the sonic speed is approached.

► **Braniff**—Following a protest by Panagra, CAB has informed Braniff that its proposed nonstop service between Lima, Peru, and Buenos Aires may adversely affect the public interest and should not be inaugurated without further investigation by the Board. Braniff plans to start DC-6 express flights from the U.S. to Buenos Aires May 29 and DC-4 tourist service on May 30.

► **Civil Aeronautics Board**—Has consolidated into a single case the applications of Mackey Air Transport, Island Air Ferries, Imperial Airways, Midet Aviation Corp., Resort Airlines and National Airlines for routes between Florida and the Bahamas. Meanwhile, Midet and Imperial were granted temporary exemptions to operate regular flights between Florida points and West End, Grand Bahama Island.

► **Colonial**—Has bought a second C-54 from Texas Engineering and Manufacturing Co., Dallas, and is slated to take delivery on the 52-passenger plane this month following its conversion by TEMCO.

► **Delta**—Planned to put a modified 28-passenger DC-3 in service this month. Company's shops reworked the ship's entire cabin interior—moving the bulkhead forward, installing a carry-on baggage rack, relocating the buffet just forward of the main cabin door and providing built-in steps. Hydraulic system was reworked for faster gear retraction, landing gear was strengthened and top of plane was painted white to reflect sunlight.

► **Eastern**—Erick Rios Bridoux, Bolivian pilot of the P-38 which crashed into an EAL DC-4 landing at Washington National Airport last Nov. 1, has filed a $300,000 counter-suit against the carrier. Previously, Eastern had sued Captain Rios for $500,000, charging him with negligence.

► **Emery Air Freight Corp.**—First-quarter net income was $49,355 against $21,833 in the same period last year.

► **Miami International Airport**—Broke all traffic records in March, when it handled 161,988 passengers and 6,507,560 lb. of cargo.

► **Mid-Continent**—Reports $24,771 net profit in March, compared with $37,265 in the same month last year. Net profit for the first quarter was $39,485, against $2453 for first three months of 1949.

► **National**—Earned $1,043,313 in first-

quarter 1950, wiping out losses of previous quarters and leaving $156,845 net income for first nine months of the current fiscal year. In comparable nine months last year, NAL showed $108,845 loss. Company recently retired the balance of its $5-million long-term loan two years before maturity.

▶ **Northwest**—First-quarter net loss was $3,612,000—up substantially over last year despite higher operating revenues.

▶ **Pan American**—CAB has extended temporarily the PAA-Panagra through-flight agreement, which provides one-plane services between the U.S. and South America. Board is still considering PAA's application to extend the pact until 1960.

▶ **South African Airways**—Has taken delivery on the first of a fleet of Constellations to be used on the Johannesburg-London run. Four other Model 749 Connies will be delivered to SAA this summer.

▶ **Taca Airways, S.A.**—Reports $67,498 net loss on $1,461,071 operating revenue in 1949, compared with a $1,832,775 loss (including $1,267,225 nonrecurring) and $1,698,936 operating revenue in 1948.

▶ **United**—This week planned to inaugurate four daily aircoach roundtrips between San Francisco-Oakland and Los Angeles (Burbank) with 66-passenger DC-4s.

CAB SCHEDULE

May 15—Oral argument in South Texas service case. (Docket 3645 et al)

May 15—Hearing on CAB's investigation of New York-Miami daylight coach service. (Docket 4302)

May 17—Hearing on case involving American Airlines' Los Angeles-San Francisco cargo flights. (Docket 4211)

May 18—Oral argument on CAB's investigation into Parks Air Lines' routes. (Docket 3965 et al)

June 1—Hearing on CAB's investigation of unauthorized cargo operations by Metropolitan Air Freight Depot, Inc. (Docket 4319)

June 5—Hearing in Florida-Bahamas service case. (Docket 2824 et al)

June 5—Resumption of CAB's enforcement hearing involving Trans American Airways, Great Lakes Airlines, Golden Airways, Edward Ware Tabor and Sky Coach Airtravel, Inc. (Docket 4161)

June 5—Hearing on approval of Transocean Air Lines' agreements with Loftleider, h.f., and Trans-Asiatic, Ltd. (Docket 4344)

June 8—Hearing on CAB's investigation of unauthorized cargo operations of American Shippers, Inc. (Docket 4296)

June 12—Hearing on applications of TWA and American Overseas Airlines to suspend service at Philadelphia on trans-Atlantic flights. (Docket 4228)

June 12—Oral argument on additional service to Puerto Rico. (Docket 2123 et al)

June 19—Hearing on CAB investigation of Northwest Airlines' tariff practices and uncertificated operations of Fly Freight, Inc., and Sterling Freightways. (Docket 4290)

Jan. 8, 1951—Hearing in Big Four mail rate case and CAB investigation of the carriers' economy and efficiency. (Docket 2849 et al)

Vapor proof Hand Lamp in use during final assembly of the BANSHEE Jet Fighter—Photo courtesy McDonnell Aircraft Corporation, St. Louis, Mo.

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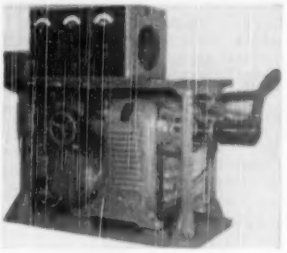

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STRICTLY PERSONAL

HOW TO IMPROVE PASSENGER MORALE—Hiram Wilson Sheridan takes time out from his column in Flying to tell us his latest Sadie-the-Stewardess tale. The sky looked ominous, and a passenger spoke to Sadie as she came back from the cockpit, "How is the weather ahead?" Sadie replied brightly, "Oh, it's good. The pilot said he could see our finish already."

* * *

CONNOR IS MISSING—This column's uncanny, unblemished ability to find lost persons gains more attention. Now we are asked to broadcast a call for the present whereabouts of **Harry P. Connor,** who was navigator for **J. Errol Boyd,** pilot of the second trans-Atlantic flight of the Bellanca monoplane, Columbia, and later was navigator for **Howard Hughes** on his record-breaking world flight. **Bill Schneider,** aviation photographer of Rahway, N. J., sends out this SOS. Any of our readers know where Connor is?

* * *

VON FLUGEN'S HONOR—We have always known that peculiar eminence attaches to those whose contributions are published in this column. The distinguished **Dr. H. A. Von Flugen** reports he has been awarded the special degree, M.B.S., in recognition of his outstanding work on oscillatory motions presented to the scientific world through this department. In a postscript, Herr Doktor confides that he is at work on a new part of the Civil Air Regulations, Part 04Q. He seeks to make this section more confusing and ambiguous than it is already, but confesses this is proving extremely difficult.

* * *

NOT HOW FAR; HOW WELL!—That outstanding aviation character, **Bob Schmidt, of Tucson Airport, has a new official picture post card which we share with you and his**

many friends today. It is sandwiched in between these lines herewith. This really modern, mechanical age sure helps an ambitious young man of Bob's natural tendencies, doesn't it?

* * *

A SHERIDAN ANECDOPE—"At Dallas," writes **Hy Sheridan,** "an airline operations manager was standing by the platform railing, surrounded by what are euphemistically known as hangers-on, watching the transports coming and going. One of the approaching airliners banked vertically around the field, pulled up into a whipstall, fishtailed to a landing, and came to a squealing stop at the gate.

"'That pilot is a little nuts, isn't he?' one of the men remarked.

"'He certainly is,' the Ops Manager said with some heat, 'he goes around with his jacket unbuttoned.'"

* * *

OUR OWN "SISTO" GETS PUBLICITY—It was only a few weeks back that this column crashed Readers Digest with one of our jokes. We've just learned that one of those gems the printers pull on us sporadically got the attention of the distinguished **Bennett Cerf** in his "Trade Winds" discussion in The Saturday Review of Literature. He said, "All of the editorial credits were properly listed on the masthead of Aviation Week, one of the McGraw-Hill technical magazines, a few issues ago. All, that is, except the name of **Henry Lefer,** editor in charge of editorial make-up. His name appeared upside down. . ."

—R. H. W.

WHAT'S NEW

New Literature

Airline executives and students of air transportation will find the 11th edition of **Air Transport Facts and Figures** a handy reference for checking scheduled airline operations for 1949. Comprehensive data compiled from the Air Transport Assn. covers traffic, safety, financial, air mail, personnel, plane utilization, airports, etc. ATA president Emory Scott Land has written a foreword. Write Air Transport Assn. of America, 1107 16th St., N.W., Washington 6, D. C.

Engineers can now obtain a subject index to technological documents in **Vol. II of the Bibliography of Scientific and Industrial Reports, Jan.-June, 1949,** issued by the U. S. Dept. of Commerce, Office of Technical Services, Washington 25, D. C. Price is $1.

Metallurgists and scientific workers will find **Equilibrium Data for Tin Alloys** an authoritative reference on tin-containing binary metallic systems, with more important systems presented in diagram form. Write to Tin Research Institute, Inc., 492 W. 6th Ave., Columbus 1, Ohio, price 50 cents postfree.

Manual on Fatigue Testing by American Society for Testing Materials is intended as a guide to those setting up new laboratory facilities, to aid in operating the equipment properly, and to advise on presentation and interpretation of data. Write the Society at 1916 Race St., Philadelphia 3, Pa., price (paper cover) $2.50, (cloth cover) $3.15.

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Price for both booklets is $2.50. Write: I. B. Laskowitz, 284 Eastern Parkway, Brooklyn 25, N. Y.

"Dictionary of Electronic Terms" is 64-page booklet defining over 2500 terms used in industrial electronics. There are more than 125 diagrams of electronic circuits.

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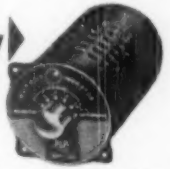

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EDITORIAL

Transport Revolution and Statesmanship

The revolution in air passenger transportation seems well under way. The certificated airlines are slowly appealing to the mass travel market which the non-scheduled carriers first began to tap.

Generally, scheduled airline fares will be lower this summer than last, and forceful promotion of packaged excursions and all-expense vacations may give air passenger figures a boost unprecedented in peace-time or war.

Some industrious air traffic promoters expect not only to take sizable passenger business away from surface carriers but to induce many persons to fly who otherwise would stay close to home this vacation season. And while the bus and to some extent the train are competitive with the family auto, the airplane offers distance and time inducements far beyond the possibilities of the motor car. Price has been a major deterrent to flying, up to now. Public worry over safety no longer is the important factor it used to be in keeping the public on the ground.

This creation of an entirely new travel market is a prime objective of the smarter airline salesmen. And all recent history proves that once a customer is introduced to air transportation, he is sold, and will probably fly wherever and whenever he travels in the future.

New low air coach rates which will be in effect this summer show up in sharp contrast to the higher fare structures the Eastern railroads introduced several months ago. In thus raising rates they shaved the differential between rail and air tickets. So they made that big time advantage the airlines offer seem even more attractive to the public than ever before. They played into the hands of the airlines.

The buses are beginning to raise fares too. Greyhound Corp. is upping rates an average of 10 percent. This is the nation's largest inter-city bus operator. These increases are on routes which the Wall Street Journal estimates account for almost a third of Greyhound's total business. The cutting of the differential between bus coach and air coach also is a step in the right direction—for air.

The rails and buses thus give an unexpected extra nudge to this great movement to air transportation in this country which was launched (and noted here) in the fall of 1948 when American Airlines sprang its successful family-fare plan, refused to increase regular fares and broke the back of the ill-conceived trend to higher fares and higher subsidies proposed by the CAB and a few airline executives.

We think the industry still does not realize the extent of the revolution it is already in. It is constantly being surprised at the number of persons who are willing to fly at reasonable rates. Who ever heard before of running up to seven and ten sections of single schedules? Yet this has been necessary recently.

So far, only a few of the railroads have been really worried about what the airlines will do to their long-distance passenger traffic. This summer, when they all will see the handwriting on the wall, look out!

Then the air transport industry, hardly out of the woods on postwar service, operations and equipment worries, will begin running headlong into stiffer, more perplexing problems stirred up by powerful surface transportation competitors. Several railroads already have opened a spirited campaign, both underground and in the open. One way or another they are trying to rein-in this buxom, energetic youngster who is "growing too big for his britches."

The rails, we can be sure, will sing the historic song of those who wish to preserve antiquity. They will fight against shedding the old and keeping up with the times by meeting new needs. They will say they speak not for themselves, of course, but in the "national interest," and for thousands of helpless stockholders—widows and children.

And Congress may be panicked into going along with the trend already so well started by the present Administration—to centralize all transport regulation in one agency under the guise of "efficiency," setting up a "coordinated national transportation policy." The imminent absorption of the Maritime Commission by the Commerce Department is one more step in this direction.

With its constant harping on the likelihood of "socialization of transportation," the railroad industry seems to display little hope of improving its own economic condition by cleaning house, improving service, experimenting with lower rates. Instead, it appears to be concentrating its fire on efforts to make the airlines and other competitors "pay their way" for various government services.

This is a meritorious objective. We are for it. But the best way to get Aviation to pay more of its way is to permit it to serve the public efficiently, utilizing its inherent advantages. The rails don't want the airlines to pay their way for the good of the country; they want to stifle the airlines' growth and initiative. Those in Aviation who favor more government help simply are asking for more government regulation, less private initiative, and a state of semi-stagnation we already see in some railroad circles.

Naturally, a national policy makes sense that gives each means of transport the freedom to perform the services it can do best. But the danger is frightening that Aviation will be swallowed up by an unwieldy, sluggish, bureaucratic leviathan even more formidable than the Interstate Commerce Commission. Aviation has suffered enough unnecessary restraint from the hands of the CAB, one of the smallest agencies in the government, which was set up by Congress expressly to "foster and promote Aviation."

Aviation's growth will bring sobering new problems. It seems desperately important that the airlines agree to stop their bickering and work together as an industry for a great cause. Statesmen will be needed in this business.

—Robert H. Wood.

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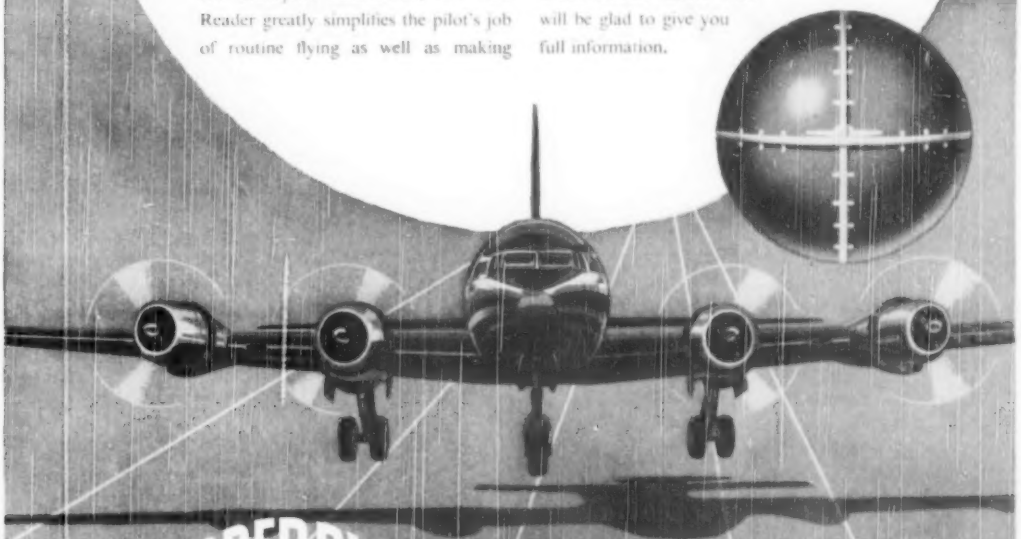

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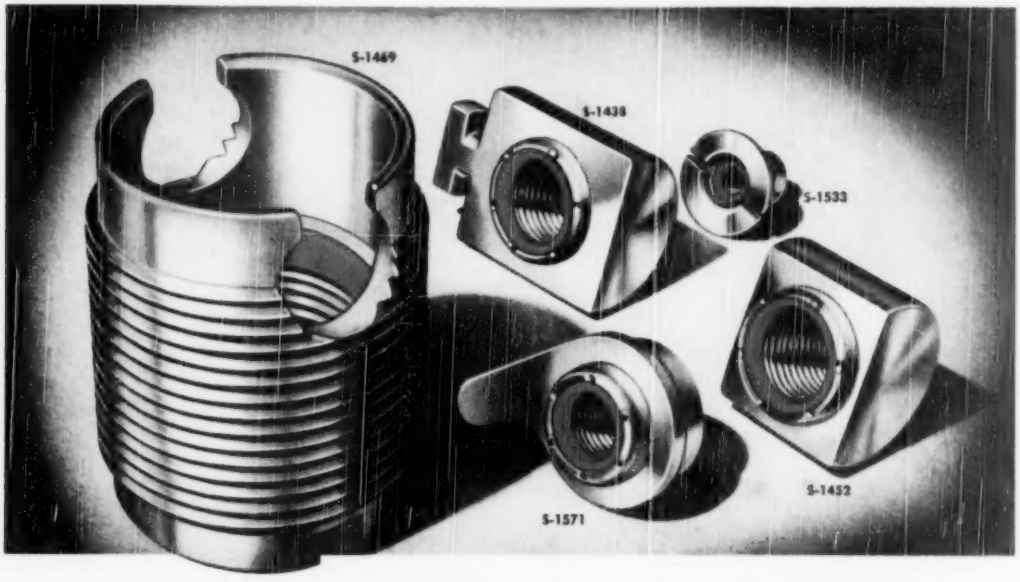

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